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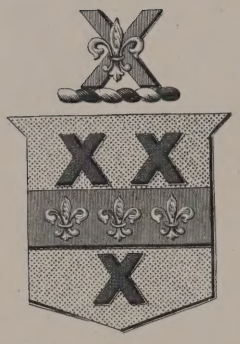

E. BARCLAY-SMITH, M.D.

List of Plates.

I. Bones.

1. Skeleton. Front view.
2. Back view of the same.
3. Side view of the same.
4. Female Skeleton.
5. Skull & its base. different views.
6. Sutures of the Skull.
7. Frontal, Parietal & Occipital bones.
8. Osa Temp. Sphen. Trian. Auris, Nasi, Mali, Sphenoid, Vomer, Palati, Maxilla. Sup. Turbinal. Unguis, &c.
9. Inf. Maxillary different views.
10. Teeth. Sections of jaws & face.
11. Front view of Trunk.
12. Dorsal & back of the same.
13. Vertebral Column.
14. Cervical, Dorsal & Lumbar Vertebra.
15. Pelvis & Sacrum.
16. Ribs & Sternum.
17. Sternum & Cartilages. also 1st & 2nd ribs of left & last true rib of right side.
18. Views of Clavicle & Scapula.
19. Views of Humerus Radius & Ulna.
20. Views of Hand & Carpus.
21. Repetition of Plate 15.
22. Ossa Innominata.
23. Views of Femur & Patella.
24. Views of Tibia & Fibula.
25. Bones of Foot in connexion.
26. The same Separate.
27. & 28. Sections of various bones.
29. Fœtal Skeleton at birth.
30. The same at 6th month. 3d. month & 10th week.
31. Bones of Fœtal Cranium.
32. Male Female & Fœtal Skeleton & Female head of ancient Sculpture.

II. Arteries.

1. Situation of Heart & Aorta.
2. i. ii Cardiac Art: on post. & ant. surfaces of Heart, iii. Uncommon variation of aorta when it has no arch. iv. Two trunks only rising from arch of aorta. v. The same but cont. of diff. vessels. vi-vii-viii-ix. Other varieties.
3. Twelve figures of other varieties.
4. Eleven figures of other varieties.
5. Art. of Throat neck & head seen in dissecting Hyena Hyoides.
6. Carotid & Subclavian Art. & their branches.
7. i. Variety of Superior Thyroid. ii. Arteries of Face. iii Distribution of Internal maxillary. iv. Lingual, Descending Palatine arteries &c. v. Arteries of internal pt. of nose.
8. i Course of Vertebral & left Cervical art. ii. Art. of base of Brain. iii. Variety of Vertebral arteries. iv. Superior branches of left Ophthalmic artery. v. Deep branches of the same. vi. Internal mammary & Sup. Intercostal art. as they occurred in body of a full grown man.
9. Art. of neck, Back, & Scapula and with in first layer of muscles.
10. Ramif. of art. dors. sc. of neck, back & Scapula.
11. Two views of art. of upper Extremity.
12. Views of post. arteries of the same.
13. Varieties of Profunda & Ram. Anast. of arm.
14. i high bifurcation of Radial artery. ii Radial coming off from humeral.
15. Other Varieties. 16. 17. & 18.
19. Thoracic Aorta.
20. Abdominal Aorta & its branches.
21. Arteries of Stomach & Liver.
22. Art. of Stomach. Duodenum Pancreas & Spleen.

23. Superior Mesenteric Artery.
24. Inferior Mesenteric artery.
25. i Internal Iliac. ii Common Iliac in a male -
26. The same in a female.
27. Arteries of the Uterus.
28. Course of External Mammary & Epigastric arteries.
29. Other views of Epigastric Art.
30. Varieties of Renal art. of Ovar. Pud. & of Obturators -
31. Arteries of Ant. pt. of thigh.
32 Art. of Post. pt. of Pelvis & thigh.
33. Varieties of Epigast. Obturator & Dorsalis Pedis arteries -
34. Art. of ant. pt. of leg & foot -
35. Art. of post. pt. of leg -
36. i. ii. iii. iv. Varieties of Obturator art. & arteries of foot & leg - v. Art. of inner side of foot.
37. ii. iii. iv. Art. of foot - Other figures & Varieties.
38. Fetal Circulation -

III. Nerves -

1. Ninth Pair or Great Hypoglossal -
2. Glosso Pharyngeal & Pharyngeal branch of 8th.
3. Cardiac Nerves -
4. The same of Left Side.
5. Pulmonary Plexus of Pneumo Gastric.
6. Nerves of heart -
7. Sympathetic from 6th rib to 3rd Lumb of Sacrum - also V-6 if. dors. V. Lumb. & Sacral Nerves.
8. Semilunar Ganglions &c. &c -
9. Sympathetic & Pneumo Gast. of left side.
10. Nerves of Liver & Stomach from Semilunar Plexus.
11. Lumbar & Sacral Nerves.
12 Great Sciatic Nerve -
13. Subcut. Nerves of right thigh leg & foot.
14. The same back view -
15. First Division of branches of femoral.
16. Cutaneous Nerves on back of thigh leg & foot -
17. 2nd & third Layer of Nerves &c.
18. Same - Back view.
19. Nerves of Arm -
20. Subcut. Nerves of fore arm.
21 Deep Nerves of arm
22. Radial Nerve exposed on post. surf. of arm.
23. Views of the Spinal cord.

Supplementary Plates.

1. Base of Brain
2. Superficial Nerves of Face & Neck.

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THE

ANATOMY

OF THE

BONES OF THE HUMAN BODY;

REPRESENTED IN

A SERIES OF ENGRAVINGS,

COPIED FROM THE ELEGANT TABLES OF

Sue & Albinus.

BY EDWARD MITCHELL, ENGRAVER.

WITH

EXPLANATORY REFERENCES,

BY THE LATE

JOHN BARCLAY, M. D. F. R. S. E.
Lecturer on Anatomy;
FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, &c. &c.

A NEW EDITION,

By R. KNOX, M. D. F. R. S. E.
LECTURER ON ANATOMY,
FELLOW OF THE ROYAL COLLEGE OF SURGEONS, &c. &c
SUCCESSOR TO DR BARCLAY.

224

EDINBURGH:
PUBLISHED BY EDWARD MITCHELL,
AND MACLACHLAN & STEWART.
1829.

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ADVERTISEMENT.

THE following Work on the BONES was originally published under the superintendency of the late Dr JOHN BARCLAY, by whom the letter-press was composed. It will be found to bear the impress of that genius and originality which characterize all the writings of that most excellent man and successful teacher. Mr MITCHELL, to whom the Work belongs, has thought this new Edition called for, in order to form a companion to those Plates of the other parts of the Human Body, which he has published, and is now publishing. He has, therefore, requested me to allow my name to appear on the title page of the work: This, however, does not imply any alteration in the admirable text of Dr BARCLAY, for indeed the only change contemplated, is the adding two or three Supplementary Plates, to illustrate more completely the osteology of the Cranium and Face, by exhibiting the complex bones on a larger scale.

In getting up the different works in which Mr MITCHELL is engaged, we have been constantly benefited by the able assistance, advice, and superintendency of Mr T. WHARTON JONES. When it is made known that, to the most extensive knowledge of Anatomy, that gentleman combines the taste and skill of an expert Draughtsman, it may readily be imagined, that whatever merit there is in these Engravings, (I allude more particularly to those of the Nerves lately published,) as accurate representations of the originals, in a great degree, belongs to him.

EDINBURGH, 4, *Newington Place*, 1829.

W. Mitchell, fecit.

PLATE I.—From ALBINUS.

The Horse, from Stubbs.

THE HEAD.

A Frontal Bone
B Parietal Bone
C Temporal process of the Sphenoidal Bone
D Squamous portion of the Temporal Bone
E Mastoid process of the Temporal Bone
F Malar, or Cheek Bone
G Nasal Bones
H Superior Maxillary Bone
I Nasal process of the Maxillary Bone
K Inferior Maxillary Bone

NECK AND TRUNK.

L Cervical Vertebræ, 7
M Dorsal Vertebræ, 12, connected with the Ribs
N Lumbar Vertebræ, 5
O Sacral Vertebræ, 5
Coccygeal Vertebræ concealed
P First Bone of the Sternum, articulated with the two Clavicles, with the first pair of Ribs, and with one half of the second pair
Q Second Bone of the Sternum, articulated with the remaining half of the second pair of Ribs, with one half of the seventh pair, and with all the intermediate pairs
R Third Bone of the Sternum, articulated with one half of the seventh pair of Ribs
S The twelve Ribs on each side
T The Cartilages of the first seven or true Ribs, articulated with the Sternum; the Cartilages of the five succeeding or false Ribs not extending so far

ATLANTAL EXTREMITIES.

U The Clavicle
V The Scapula
X The Humerus
Y Proximal Extremity of the Humerus
Z Distal Extremity of the Humerus
a Radial Condyle of the Humerus
b Ulnar Condyle of the Humerus
c The Radius
d The Ulna
e The Carpus, 8 Bones
f The Metacarpus, 5 Bones
g The Digital Phalanxes, three in each Finger, and two in the thumb

SACRAL EXTREMITIES.

h The Ilium
i The Ischium } the three forming the Os Innominatum
k The Pubis
l A part of the Ischiadic notch
m Foramen Obturatorium
n The Femur
o Its large Trochanter
p Its small Trochanter
q Its tibial Condyle
r Its fibular Condyle
s The Rotula, or Patella
t The Tibia
u The Fibula
v The Tarsus, 7 Bones
x The Metatarsus, 5 Bones
z The Digital Phalanxes, three in the small Toes, and two in the great Toe

PLATE II.—From ALBINUS.

The Horse, from Stubbs.

THE HEAD.

A Frontal Bone
B Parietal Bone
C Mastoid process of the Temporal Bone
D Malar Bone
E Occipital Bone
F Inferior Maxillary Bone

NECK AND TRUNK.

G Cervical Vertebræ
H Dorsal Vertebræ
I Lumbar Vertebræ
K Sacral Vertebræ
L Coccygeal Vertebræ
M The Ribs

ATLANTAL EXTREMITIES.

N Clavicle
O Scapula
P Its Spine
Q Its Acromion Process
R Humerus
S Radius
T Ulna
U Carpus
V Metacarpus
X Digital Phalanxes

SACRAL EXTREMITIES.

a Ilium
b Ischium } forming the Os Inominalum
c Pubis
d Ischiadic Notch
e Foramen Obturatorium
f Femur
g Its large Trochanter
h Its small Trochanter
i Its tibial Condyle
k Its fibular Condyle
l Tibia
m Malleolus Internus
n Fibula
o Malleolus Externus
p Tarsus
q Metatarsus
r Digital Phalanxes

E. Mitchell sculpt.

E. Mitchell Sculp.t

PLATE III.—From ALBINUS.

The Horse, from Stubbs.

THE HEAD.

A Frontal Bone
B Parietal Bone
C Temporal process of the Sphenoidal Bone
D Squamous portion of the Temporal Bone
E Mastoid process of the Temporal Bone
F Malar, or Cheek Bone
G Occipital Bone
H Snperior Maxillary Bone
I Inferior Maxillary Bone
K Ramus of the Inferior Maxillary

NECK AND TRUNK.

L Cervical Vertebræ
M Dorsal Vertebræ
N Lumbar Vertebræ
O Sacral Vertebræ
P Coccygeal Vertebræ
Q Ribs

ATLANTAL EXTREMITIES.

R Scapula
S Spine of the Scapula
T Acromion Process
U Humerus
V Proximal Extremity
X Distal Extremity
Y Radial Condyle
Z The Radius
a The Ulna
b The Carpus
c The Metacarpus
d The Digital Phalanxes

SACRAL EXTREMITIES.

e The Ilium
f The Ischium
g The Pubis
h Ischiadic Notch
i The Femur
k Proximal Extremity
l Tibial Condyle
m Fibular Condyle
n Rotula, or Patella
o Tibia
p Fibula
q Malleolus Internus
r Malleolus Externus
s Tarsus
t Metatarsus
u Digital Phalanxes

PLATE IV.—The FEMALE SKELETON, from SUE.

The Ostrich, from Cheselden.

THE HEAD.

A The Frontal Bone
B Parietal Bone
C Temporal process of the Sphenoidal Bone
D Squamous portion of the Temporal Bone
E Mastoid process of the Temporal Bone
F Malar, or Cheek Bone
G Superior Maxillary Bone
H Nasal process of the Superior Maxillary Bone
I Nasal Bones
K Inferior Maxillary Bone
L Ramus of the Inferior Maxillary Bone

NECK AND TRUNK.

M Cervical Vertebræ
N Dorsal Vertebræ
O Lumbar Vertebræ
P Sacral Vertebræ
Q Coccygeal Vertebræ
R Ribs
S Sternum

ATLANTAL EXTREMITIES.

T Clavicle
U Scapula
V Humerus
X Its Radial Condyle
Y Its Ulnar Condyle
Z Radius
a Ulna
b Carpus
c Metacarpus
d Digital Phalanxes

SACRAL EXTREMITIES.

e Ilium
f Ischium
g Pubis
h Ischiadic Notch
i Foramen Obturatorium
k Femur
l Tibial Condyle
m Fibular Condyle
n Rotula, or Patella
o Tibia
p Malleolus Internus
q Fibula
r Malleolus Externus
s Tarsus
t Metatarsus
u Digital Phalanxes

E. Mitchell jculp.

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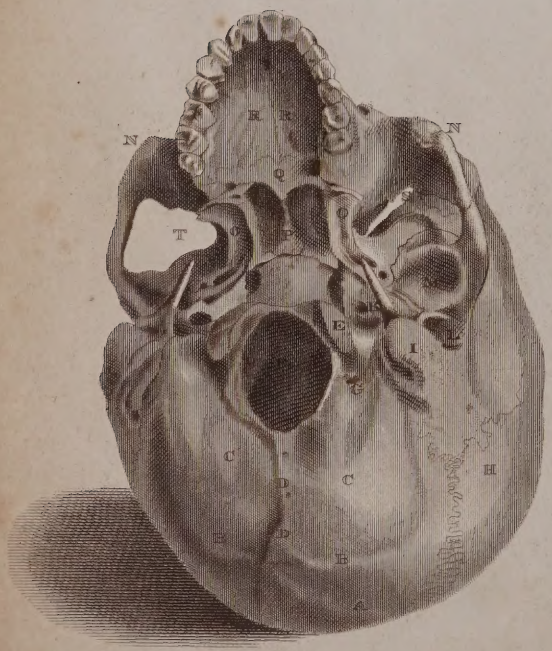

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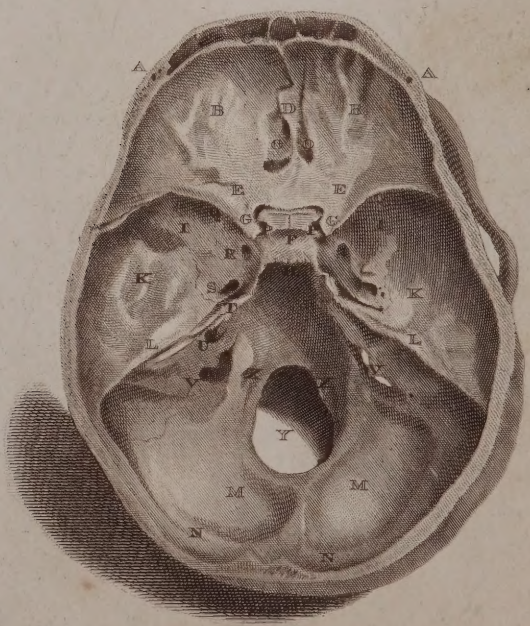

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PLATE V.—From SUE.

FIG. I.

A Frontal Bone
B Superciliary Ridge
C Glabella
D Internal angular process
E External angular process
F Orbitary process
G Foramina Supraorbitaria
H Parietal Bone
I Squamous portion of the Temporal Bone
K Temporal process of the Sphenoidal Bone
L Orbitary process of the Sphenoidal Bone
M Malar, or Cheek Bone
N Os planum
O Os Unguis
P Nasal Bones
Q Nasal process of the Superior Maxillary
R Superior Maxillary
S Foramina Infraorbitaria
T Inferior Maxillary
U Ramus of the Inferior Maxillary
V Foramina Menti

FIG. II.

A Frontal Bone
B Superciliary Ridge
C Glabella
D Internal angular process of the Frontal
E External angular process
F Orbitary process
G Foramen Supraorbitarium
H Parietal Bone
I Squamous portion of the Temporal Bone
K Temporal process of the Sphenoidal Bone
M Malar, or Cheek Bone
N Os planum
O Os Unguis
P Nasal Bone
Q Nasal process of the Superior Maxillary
R Superior Maxillary
S Foramen Infraorbitarium
T Inferior Maxillary
U Ramus of the Inferior Maxillary
V Foramen Menti

FIG. III.

A Occipital Bone
B Superior transverse Ridge
C Inferior transverse Ridge
D Perpendicular Ridge
E Condyloid Process
F Foramen Magnum
G Posterior Condyloid Foramen
H Parietal Bone
I Mastoid Process
K Styloid Process
L Meatus Auditorius Externus
M Articular Cavity
N Malar, or Cheek Bone
O Pterygoid process of the Sphenoidal
P Vomer
Q Palatin Plate of Palate Bone
R Palatin Plate of the Superior Maxillary
S Spheno Maxillary Fissure
T Temporal Fossa

FIG. IV.

A Frontal Bone
B Orbitary processes of the Frontal
C Frontal Sinuses
D Crista Galli of the Ethmoidal Bone
E Transverse Orbitary processes of the Sphenoidal
F Sella Turcica
G Anterior Clinoid processes
H Posterior Clinoid
I Temporal process of the Sphenoidal
K Squamous portion of the Temporal
L Petrous portion
M Occipital Bone
N Situation of transverse Sinuses
O Foramina Cribriformia
P Foramina Optica
Q Foramina Lacera Anteriora
R Foramina Rotunda
S Foramina Ovalia
T Foramina Spinosa
U Meatus Auditorius Internus
V Foramina Lacera Posteriora
X Foramina Condyloidea Anteriora
Y Foramen Magnum

PLATE VI.—From SUE.

A Coronal Suture

B Sagittal Suture

C Lamdoidal Suture

D D Ossa triquetra, or Ossa Wormiana in the Lambdoidal Suture

E Squamous Suture

F F Parietal Foramina, occurring frequently, but not always

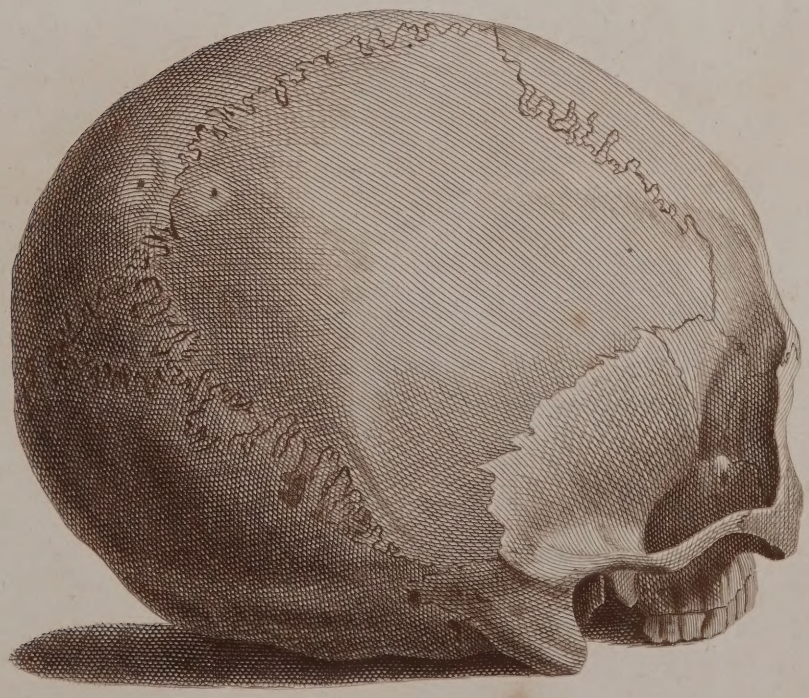

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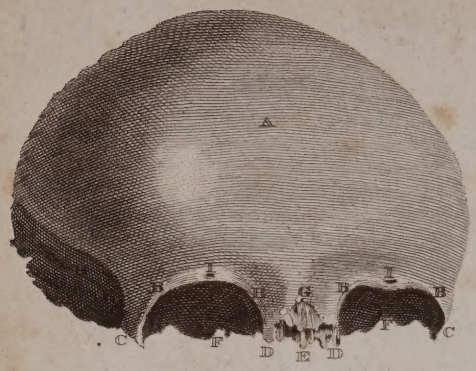
Fig. 1.



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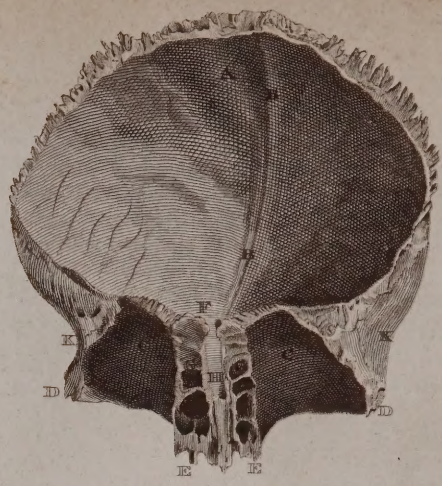


Fig. 3.

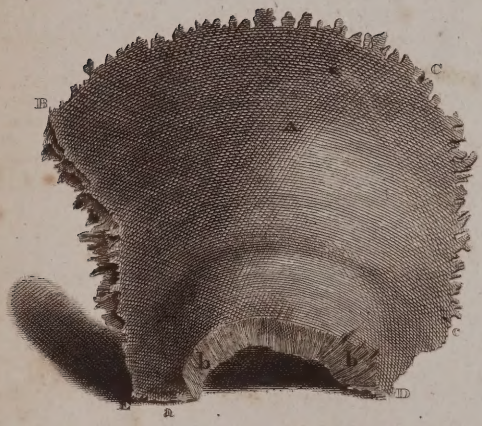


Fig. 4.

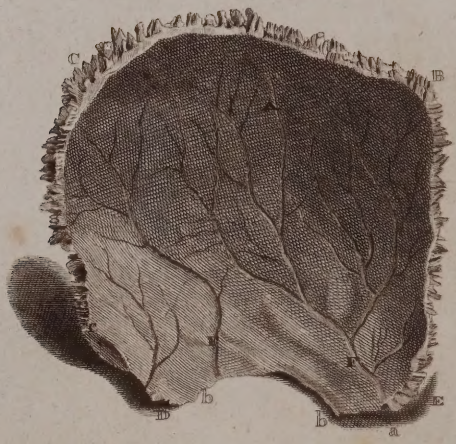
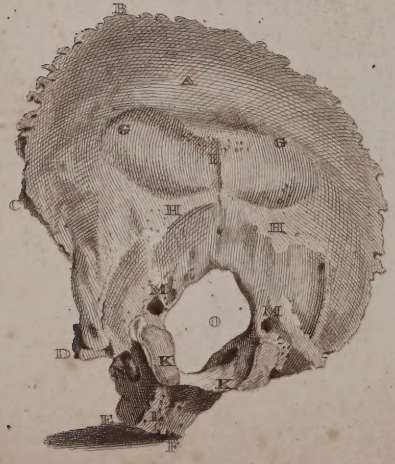


Fig. 5.



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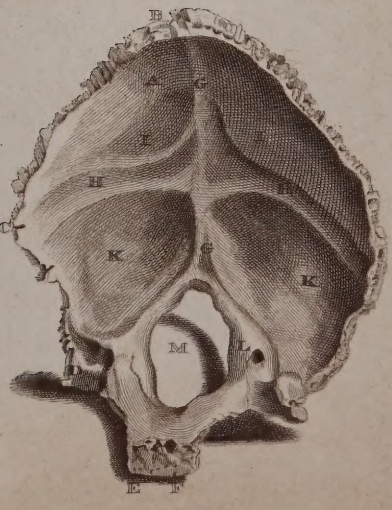

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PLATE VII.—From SUE.

FIG. I.

A Frontal Bone from Without
B Superciliary Ridges
C External angular processes
D Internal angular processes
F Orbitary processes
G Glabella
I Foramina Supraorbitaria
K Temporal Fossa
L Lacrymal Fossa

FIG. II.

A Frontal Bone from Within and Below
B Spinous process
C Orbitary processes
D External angular processes
E Internal angles of Orbitary processes
F Foramen Cæcum
G Orifices of the Frontal Sinus
H Space for the Ethmoidal Bone
I Lacrymal Fossa
K Temporal Fossa

FIG. III.

A Left Parietal Bone from Without
B C Its Coronal Margin, where it joins its fellow at the Sagittal Suture
E D Its Basilar Margin. a. Where it joins the Temporal process of the Sphenoidal Bone. bb. Where it joins the Squamous portion of the Temporal Bone.
B E Its Glabellar Margin, where it joins the Frontal Bone at the Coronal Suture
C D Its Inial Margin. C c Where it joins the Occipital Bone; and, c D where it joins the Mammillary portion of the Temporal Bone at the Lambdoidal Suture

FIG. IV.

A Left Parietal Bone from Within
F Arborescent impressions of the Meningeal Artery
B C and the other letters indicate the same parts as in figure third, which see

FIG. V.

A Occipital Bone from Without
B C Margin connected with the Parietal Bone. C D Margin connected with the Mammillary portion of the Temporal Bone. D E Margin contiguous to the Petrous portion of the Temporal Bone
E F Margin where separated from the Sphenoidal Bone
G Superior transverse Ridge
H Inferior transverse Ridge
I Perpendicular Ridge
K Condyloid processes
L Cuneiform process
M Posterior Condyloid Foramen
N Anterior Condyloid Foramen
O Foramen Magnum

FIG. VI.

A The Occipital Bone from Within
B C. C D. D E. and F, denote the same Margins as in the last figure, which see
G H Cruciform Ridges
G G To which is attached the Falciform process of the Dura Mater, which forms, by an interstice between its Laminæ, the Longitudinal Sinus
H H To which is attached the Tentorium Cerebelli, forming, by the interstices between its Laminæ, the transverse Sinuses. The grooves in the Ridges from the action of the blood that flows in the Sinuses.
I Impressions corresponding to the posterior lobes of the Cerebrum
K Impressions corresponding to the two lobes of the Cerebellum
L Posterior Condyloid Foramen from within
M Foramen Magnum

PLATE VIII.—From SUE.

FIG. I.

LEFT TEMPORAL BONE from WITHOUT.

A Squamous portion
B Mammillary portion
C Petrous portion
D Mastoid process
E Styloid process
F Vaginal process
G Auditory process
H Zygomatic process
I Meatus Auditorius Externus
K Situation of the Foramen Stylomastoideum
L Fossa of the Biventer Maxillæ
M Articular Fossa
N Fissure of Glasserus
O Temporal Fossa

FIG. 2.

LEFT TEMPORAL BONE from WITHIN.

A Squamous portion
B Mammillary portion
C Petrous portion
D Mastoid process
E Styloid process
F Meatus Auditorius Internus
G Groove of the transverse Sinus
H Groove of superior-petrous Sinus
I Portion of the Foramen lacerum Posterius
K Part of the Jugular Fossa

FIG. 3.

SPHENOIDAL BONE from ABOVE.

A Temporal processes, or larger wings of Ingrassias
Transverse Spinous, or transverse Orbitary processes, or the lesser wings of Ingrassias
C Anterior Clinoid processes
D The Processus Olivaris
E Posterior Clinoid processes
F Spinous processes
G Styliform processes
H Pterygoid processes
a External Plates of
b Internal Plates
I Unciform processes, or extremities of the Internal Plates
K Foramina Optica
L Foramina Lacera Anteriora
M Foramina Rotunda
N Foramina Ovalia
O Foramina Spinosa
P Sella Turcica
Q Depressions corresponding to the convexities of the middle Lobes of the Cerebrum

FIG. 4.

SPHENOIDAL BONE from BEFORE.

A Temporal processes
B Parts of the Temporal processes pointing to the Orbits, and thence termed Orbitary processes
C Transverse Spinous, or transverse Orbitary processes
D The Spinous processes
E Pterygoid processes
a External Plates
b Internal Plates
c Unciform processes
F Azygous process
G Triangular processes
H Foramina Lacera Anteriora, or Sphenoidal Fissures
I Foramina Rotunda
K Foramina Ovalia
L Foramina Pterygoidea, or of Vidus Vidius
M Sphenoidal Sinus
N Spaces between the Plates of the Pterygoid processes for receiving the Pterygoid processes of the Palate Bones

E. Mitchell sculp.

PLATE VIII.—*Continued.*

FIG. 5.

ETHMOIDAL BONE from ABOVE.

A Cribriform Plate

B Crista Galli

C Triangular Bones, as connected with the Ethmoidal. See also Fig. 4. G G. and Figures 6, 7, and 8.

D Part of the Ethmoidal Cells

E Part of the Right Os Planum

FIG. 6.

ETHMOIDAL BONE from BELOW.

A Nasal Plate, forming a part of the Nasal Septum and continued Basilad, or downwards from the Crista Galli to the Vomer. See Fig. 24 of the following Plate

B Superior Spongy Bones

C Triangular Bones

FIG. 7 and 8.

TRIANGULAR BONES DETACHED.

A Ethmoidal process

B Anterior Sphenoidal process

C Posterior Sphenoidal process. See it in connexion Fig. 4, 5, and 6.

FIG. 9 and 10.

THE OSSEOUS CIRCLE of the EAR,

To which the Membrana Tympani is attached, and the only part of the Meatus Auditorius Externus that is Ossified in the Fœtus. In Fig. 9, seen from without, in Fig. 10, from within

A The Larger and Posterior Extremity

B The Anterior or Smaller Extremity

C Part of the Groove into which the Membrana Tympani is inserted

D D The same Groove seen to a greater extent

FIG. 11, 12, 13, 14.

THE FOUR BONES of the TYMPANUM.

11. The Malleus or Hammer

12. The Incus or Anvil

13. The Stapes or Stirrup Bone

14. The Os Orbiculare

FIG. 15, 16, 17, 18.

THE SAME BONES MAGNIFIED.

FIG. 15.

A The Head of the Malleus

B The Handle of the Malleus

C The Processus Brevis, or short process of the Malleus

D The Processus Gracilis, or the Process of Raw

E The Cervix, or Neck of the Malleus

F Articular Surface, where it rests on the Incus

FIG. 16.

A The Body of the Incus

B Its short process

C Its long process, which rests on the Head of the Stapes, with the Os Orbiculare interposed

D The Articular Cavity for receiving the Head of the Malleus

E The Os Orbiculare attached to the Incus

FIG. 17.

A The Head of the Stapes

B The Base

C The Long Limb

D The Short Limb

Both the Limbs and the Base are grooved on the sides where they point to one another for the insertion of a thin membrane

E Part of that Groove seen in the Base

PLATE VIII.—*Continued.*

FIG. 18.

Os Osbiculare, when in connexion, situated between the Head of the Stapes and the long process of the Incus. See it attached to the Incus at E, Fig. 16.

FIG. 19.

These four Bones in Situ or Connexion

FIG. 20, 21.

Semicircular Canals and Cochlea, cut out and prepared from the Petrous portion of the Temporal Bone; these, with the Vestibule or Cavity in which the Semicircular Canals begin and terminate, constitute what is called the Labyrinth of the Ear

FIG. 20.

A The part of the Cochlea which points to the Meatus Auditorius Internus
B The Superior Canal
C The Horizontal
D The Vertical

FIG. 21.

E A part of the Superior Canal
F A part of the Horizontal
G The whole of the Vertical
H The Fenestra Ovalis
I The Fenestra Rotunda
K The outward, or Convex part of the Cochlea

FIG. 22.

The Vomer, which forms a part of the Nasal Septum
A B Coronal or Upper Margin, grooved for receiving the Nasal Plate of the Ethmoidal Bone
B C Margin pointing coronad and iniad, or upwards and backwards; and also grooved for receiving the Azygous process of the Sphenoidal Bone
A D Basilar or Inferior Margin, pointing downwards or Basilad, and resting on the Spinous processes of the Superior Maxillary Bones, and the Palate Plates of the Palate Bones
C D The Free Edge of the Vomer, pointing Iniad and Basilad, or backwards and downwards. See it in connexion, Fig. 24, Plate X.

FIG. 23, 24.

The Left Malar or Cheek Bone from Without and from Within

FIG. 23.

FROM WITHOUT.

A Superior Orbitary process
B Inferior Orbitary process
C Internal Orbitary process
D Maxillary process
E Zygomatic process
F A Foramen not always very regular

FIG. 24.

FROM WITHIN.

E The Temporal Fossa. See the last Figure, where the same letters refer to the same parts

FIG. 25, 26.

Palate Bones of the Right Side under different aspects
A Palate Plate, on the same Plane with the Palate Plate of the Superior Maxillary Bone
B Nasal Plate, rising from the Palate Plate at nearly a right angle
C Termination of the Nasal Plate in the Orbit, called its Orbitary process

PLATE VIII.—*Continued.*

D Pterygoid process of the Palate Bone, situated, when in connexion, between the two Plates of the Pterygoid process of the Sphenoidal Bone

FIG. 26.

E Part of the Spheno Palatin Foramen
F Part of the Pterygo Palatin Canal

FIG. 27.

NASAL BONES from WITHOUT.

FIG. 28.

NASAL BONES from WITHIN.

A Where they rest on the Frontal Bone at the Glabella
B Where the two unite in the Mesial Plane, by what is improperly called an Harmonic Suture
C Where they join the Nasal processes of the Superior Maxillary Bones
D Where they join the Cartilaginous Alæ of the Nose

FIG. 29.

LEFT SUPERIOR MAXILLARY BONE from the External or Lateral aspect, along with the PALATE BONE.

A Nasal Process
B Orbitary process
C Malar process
D Alveolar process
E Tuberous process
F Part of the Spinous process
G Foramen Infraorbitarium
H A part of the Palate Bone

FIG. 30.

The same Bone from the MESIAL ASPECT, along with the PALATE BONE.

A Nasal process
a a Ridge, showing the place of junction between it and the Inferior Spongy Bone
B Spinous process
C Palatin process
D Suture between the Palate and Maxillary Bones
E Pterygoid process of the Palate Bone. e Foramen Gustatorium, or termination of the Pterygo-Palatin Canal
F A Sinus in the Orbitary process of this Palate Bone
G Orifice of the Maxillary Sinus, the Maxillary Antre, or the Antrum Highmorianum
H Groove, forming part of the Nasal Duct
I A Groove, forming half of the Canal that terminates in the Foramen Incisivum

FIG. 31.

OS UNGUIS, or OS LACRYMALE of the Right Side, viewed from the ORBIT.

A Part of the Groove for lodging the Lacrymal Sac, the remaining part being formed by the Nasal process of the Superior Maxillary Bone

FIG. 32.

The same Bone from the NASAL ASPECT.

FIG. 33.

INFERIOR SPONGY BONE of the RIGHT SIDE.

A Its Anterior or Antinial Margin
B Its Inial or Posterior Margin
C Its Inferior or Basilar Margin
D Its Superior or Coronal Margin

When in connexion it extends. See Fig. 30, from a. In the Nasal process of the Superior Maxillary Bone, iniad or backward along the Ridge. f. in the Nasal Plate, of the Palate Bone, and in the adult, adheres firmly to these parts. While

in connexion, therefore, it must necessarily cover a part of the Nasal Groove, H Fig. 30, and contribute to the formation of the Nasal Duct, which is continued from the Lacrymal Groove in the Orbit. In passing over the Groove, it regularly sends off, towards the Orbit, a thin lamina or process, covering the Groove till it reaches the Orbit, in this way completing the Duct. This process, however, is not represented in the Figure before us. As it extends iniad or backward to the Nasal Plate of the Palate Bone, it covers also a part of the Orifice of the Maxillary Antre G, reflecting laterad from its Superior Margin the process E, by which, seeming to hang as it were by a hook from the Orifice of the Antre. That process has been termed its Unciform process

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PLATE IX.

This Plate exhibits different Representations of the Basilar Maxilla, or Lower Jaw. The one at the bottom towards the left, marked 1. *is copied from* Sue ; *the rest from Specimens in* Dr Barclay's *Museum.*

A In each figure, shews the situation of the Foramen Menti on the left side. The space between the two Foramina is what in Anatomy is strictly called Mentum, being here of a more determinate meaning than in classical writers. The curvature of the Jaw between the Foramina undergoes little change from birth to maturity. At birth, this Jaw is in two pieces, united, at the middle of the curvature between the Foramina, by a junction which is termed the Symphysis Menti, seen in a line marked a b, in figure 1. From the Symphysis, the sides lengthen and diverge iniad or backwards, to receive the increasing number of Teeth

B The Margin on which the Jaws are appearing to rest, is termed the Base

C Points out the part which is termed the Angle. This angle varies several degrees in different jaws, and is generally more obtuse in the infant than in the adult, if the teeth be remaining; or, in other words, is more obtuse before all the teeth have sprung up, or after they have all dropped out, than when they are full grown and present. See Fig. 5, where they have partly dropped out; Fig. 6, where they have all dropped out; and Fig. 23 of the following Plate, where they have nót all sprung up

D The part which rises from the Angle, is termed the Ramus or Branch, and ends Coronad in two processes in

E The Condyloid, by which it is articulated with the Temporal Bone; and in

F The Coronoid for the insertion of the Temporal Muscle. In Fig. 6, where the teeth have dropped out, this process is almost obliterated, in consequence of absorption

G In the Inner or Mesial Aspect of the Ramus, shews the Orifice of the Inferior Maxillary Canal, by which the Nerve and Blood-vessels enter to supply the teeth. The opposite extremity of this canal is the Foramen Menti of the same side

The Sockets in which the teeth are inserted are termed Alveoli, from their resemblance to honeycomb, and constitute what are called the Alveolar Processes

These Alveoli, with the teeth, are complete in Fig. 1 and 2; without the teeth in Fig. 4; with the teeth, and laid open on one side, in Fig. 3; partly absorbed, and partly remaining, in Fig. 5; totally absorbed in Fig. 6, and not filled up as Dr Monro has it

From the absorption of the alveolar processes, the depth of the jaw becomes less from the alveolar margin to its base; the face, consequently, when the mouth is shut, appears shorter, and the neck, from the jaw receding upwards, appears longer

When the sides of the jaw do not lengthen backwards so fast as the permanent Dentes Molares spring up, these teeth are sometimes observed emerging from the inner side of the Ramus, as in Fig. 23 of the following Plate. In Fig. 2 of

PLATE IX.—*Continued.*

this Plate, one of these teeth is seen growing horizontally forward at letter H.

The following Figures are copied from SUE:

Fig. 7. An Incisor with a curved Fang

Fig. 8. An Incisor with a Fang uncommon as to shape and size

Fig. 9. A Grinder with curved Fangs

Fig. 10. A Grinder with two Coronæ attached to one Fang

Fig. 11. A Grinder with two Fangs converging

Fig. 12. A Grinder with two Fangs diverging

As Fig. 9. has three Fangs; so some opposite to the Maxillary Antre in the upper jaw have four, while Mr Fox gives the figure of a tooth that had five, and a figure of two contiguous Molares with their Fangs interwoven.

E. Mitchell sculp.

PLATE X.

Every Tooth, as described by Anatomists, has a Corona, a Cervix, and a Fang or Fangs. The Corona is the part that projects above the Socket, the Fang the part that is lodged in the Socket, and the Cervix the line of demarcation between them. The ossification of the pulpy substance of which a tooth is formed, begins in the Corona, and at its commencement exhibits the appearance of a thin shell or crust; extends superficially over the pulp towards the extremity of the fang, and then centrad towards the axis of the tooth, leaving at last no part unoccupied, but that which serves as a passage for the nerve and blood-vessels. In short, a tooth grows from the corona towards the fang, or from the head towards the root, and from the circumference towards the centre, instead of from the centre towards the circumference, like most other bones. The pulp itself derives its origin from a thin vascular sac in which it is enclosed.

All the figures of the following plate, excepting the last, are carefully copied from two plates in the Second Book of the Annotationes Academicæ of Albinus. Their object is to shew the progress of growth and ossification in the different teeth.

Few perhaps require to be informed, that the first teeth which appear in the jaws are deciduous or temporary, and that those which succeed are called permament. In the following plate, Albinus not only alludes to this distinction, but to another; by which both the temporary and the permanent teeth are divided into Dentes Incisivi, Front or Cutting Teeth (*a*), four in each jaw; into Dentes Canini, or Tearing Teeth, two in each jaw, and termed Canini (*b*) from being conspicuously large in the dog, as they rise on each side of the Incisivi; and into Dentes Molares (*c*), or Grinding Teeth, four in each jaw if temporary teeth, and ten in each jaw if they be permanent: the complete number of temporary teeth in both jaws being twenty, and the permanent teeth in both jaws, when they are completed, being thirty-two.

1. The first series shews the progress of ossification in the first Incisores of the upper jaw
2. A similar progress in the first Incisores of the lower jaw
3. A like progress in the Dentes Canini
4. —— in the first deciduous Molares of the upper jaw
5. —— in the second deciduous Molares of the upper jaw
6. —— in the first deciduous Molares of the lower jaw
7. —— in the second deciduous Molares of the lower jaw
8. Longitudinal sections of these teeth at different periods of ossification; the five first—of the Dentes Incisivi; the seventh and eighth—of the Dentes Canini; and the ninth—of a Molaris or Grinder.

(*a*) Synonymes. Incisores. Tomici. Risorij. Quaternij. Anteriores. Acuti. Τομεις. Τμητικοι. Διχασηρες. Κλεινες. Γελασινοι. Οξεις.

(*b*) Oculares. Fractorij. Collaterales. Columellares. Cuspidati. Κυνοδοντες.

(*c*) Maxillares. Clavales. Genuini. Dentes Buccarum. Μυλαι. Μυλίαι. Γομφιοι. Παλαιες. Φρασηρες. The two first next the Canini being termed Bicuspides, or Bicuspidati, by Mr Hunter, and some others; while the last are usually known by the appellation of Dentes Sapientiæ, or Wisdom Teeth. σωφρονισηρες, in the language of Hippocrates, and κρανίηρες, in that of Aristotle, απο τε κρανειν και απο τε πληρες την ηλικιαν.

PLATE X.—*Continued.*

9. Appearances of temporary Incisivi after being shed
10. —— of temporary Canini after being shed
11. —— of temporary Molares after being shed
12. The first deciduous Incisor retiring
13. The first permanent Incisor commencing
14. The second deciduous Incisor retiring
15. The second permanent Incisor commencing
16. The second deciduous Incisor on the left of the lower jaw
17. The second deciduous Incisor on the right of the lower jaw
18. A section of the jaw, in which the second Incisors, the deciduous and permanent, appear at the same time

19 and 20. Sockets of the Dentes Molares, after the teeth had dropped out

21. The Sockets of the deciduous Incisores and Canini, with a permanent Incisor and Caninus springing up

22 and 23. Sections of the upper and lower jaws, showing the deciduous and permanent teeth at the same time in distinct Sockets; and at A, Fig. 23, the orifice of the inferior Maxillary Canal, as in young subjects, situated near to the angle of the jaw, and pointing iniad or backwards

24. From Dr Barclay's Museum. A vertical section of a part of the Face, showing the formation of the Nasal Septum, so far as it is constructed of bone

A The Crista Galli of the Ethmoidal Bone, continued basilad, or downwards, into

B The Nasal Plate of the Ethmoidal Bone, which Nasal Plate is received by

C The Vomer, into a groove at cc; the remaining part of its groove, between c E, receiving the Azygous Process of the Sphenoidal Bone, while at its lower or basilar margin, dd, it rests upon

D The Spinous Process of the superior Maxillary Bone. To complete the Septum, the dark triangular space marked

FFF Is occupied by cartilage in the recent subject.

G A part of the Frontal Sinus

H A part of the Sphenoidal Sinus

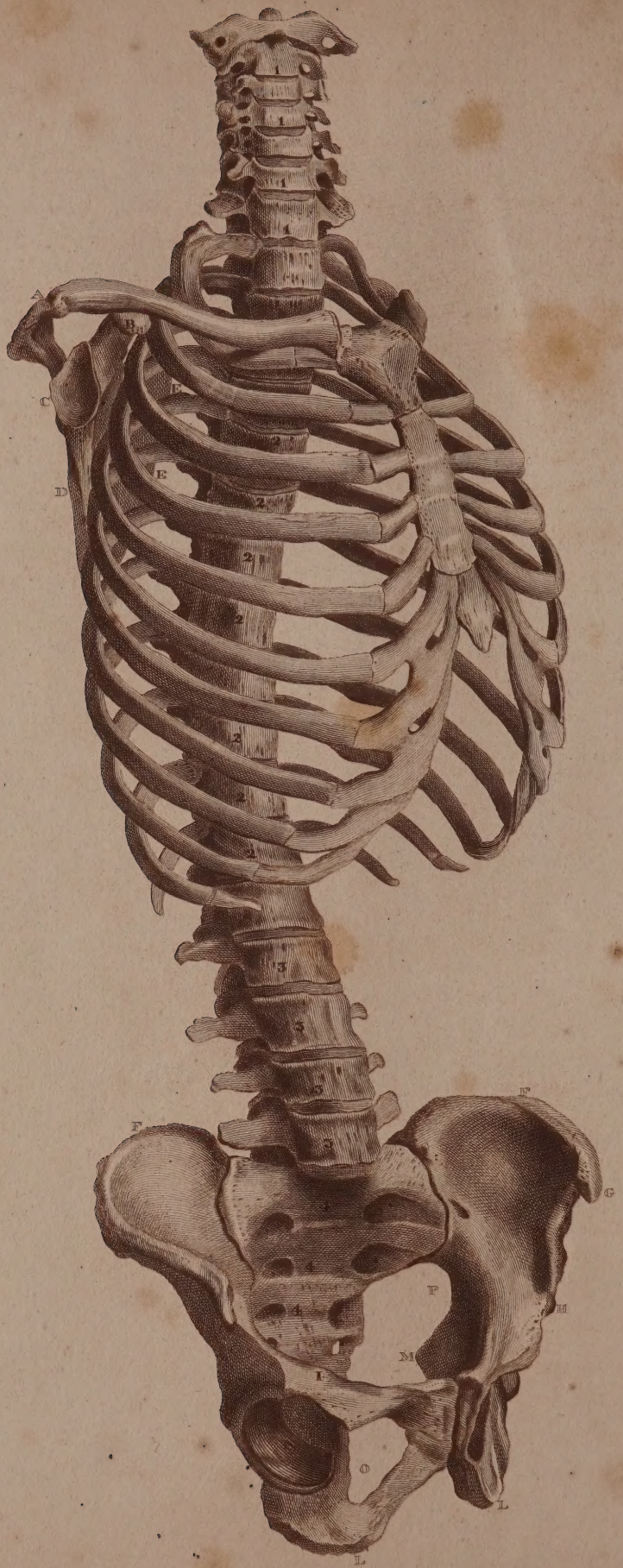
II The two plates of the Pterygoid Process of the Sphenoidal Bone

K The Unciform Process, or termination of the internal plate

L The Spinous Process of the Sphenoidal Bone, and

M Its Slyliform Process, projecting basilad

N The Palate Plate of the superior Maxillary Bone



E.Mitchell sculp.t

PLATE XI.—From SUE.

This Plate represents a Front View of the Trunk, with some inclination to the Left Side. The parts seen are the different Curvatures of the Vertebral Column, the Sternum and Cartilages of the Ribs, the whole Clavicle, and most of the Scapula of the Right Side.

The Curvatures of the Vertebral Column are four: The Cervical, Thoracic, Lumbar, and Sacral; designated by the numbers, 1, 2, 3, 4; and are alternately Sternad and Dorsad, from the Atlas, or First Vertebra of the Neck, to the farther extremity of the Os Sacrum; or, if the Coccygeal Vertebræ be included as a part of the Column, the number of its Curvatures will then be five.

All the Bodies of the true Vertebræ, with the exception of the Atlas and Atlantal aspect of the Vertebra Dentata (the First and Second Vertebræ of the Neck), are united by means of Ligaments and Cartilages, termed Inter-Vertebral. The five Vertebræ of the Os Sacrum are inseparably united by Ossification.

The Atlas, on one side, is articulated with the two Condyloid processes of the Occipital Bone. The Vertebra next the Atlas, is the Vertebra Dentata, and so named from a peculiar tooth-like process, called Processus Dentatus, or Processus Odontoides. Besides this peculiar process, it has also the processes which are common with the rest of the true Vertebræ. These processes are seven. Each Vertebra having a process projecting dorsad, which is called the Spinous; two laterad, which are termed the Transverse; and four Articular, by two of which it is connected with the Vertebra; immediately atlantad or above, and by the remaining two with the Vertebra, immediately Sacrad, or below.

The Transverse processes of the Cervical Vertebræ are here seen perforated, for the transmission of the Vertebral Artery.

The Transverse processes of the Thoracic, or Dorsal Vertebræ, are imperfectly seen in this Figure, from their being nearly in a line with the Ribs with which they are articulated. Those of the Lumbar Vertebræ are conspicuous, particularly on the right side, while those of the Sacrum, like the bodies of its Vertebræ, are entirely united by Ossification.

The Thoracic or Dorsal Vertebræ, with the Ribs, their Cartilages, and the Sternum, constitute what is called the Cavity of the Thorax, in which are contained the Lungs and the Heart, included together under the name, 'Vital Organs.'

This Cavity, in man, quadrupeds, birds, and cetaceous animals, is always somewhat of a conical form, and contrary to what we observe in fishes, widens from the neck downwards or sacrad. The Ribs lie in planes, inclined towards the Vertebral column, with which they are articulated, and the inclination is seen gradually increasing from the first Rib towards the last. What are usually termed the depression and elevation of the Ribs, in respiration, are merely changes produced in the inclination of their planes.

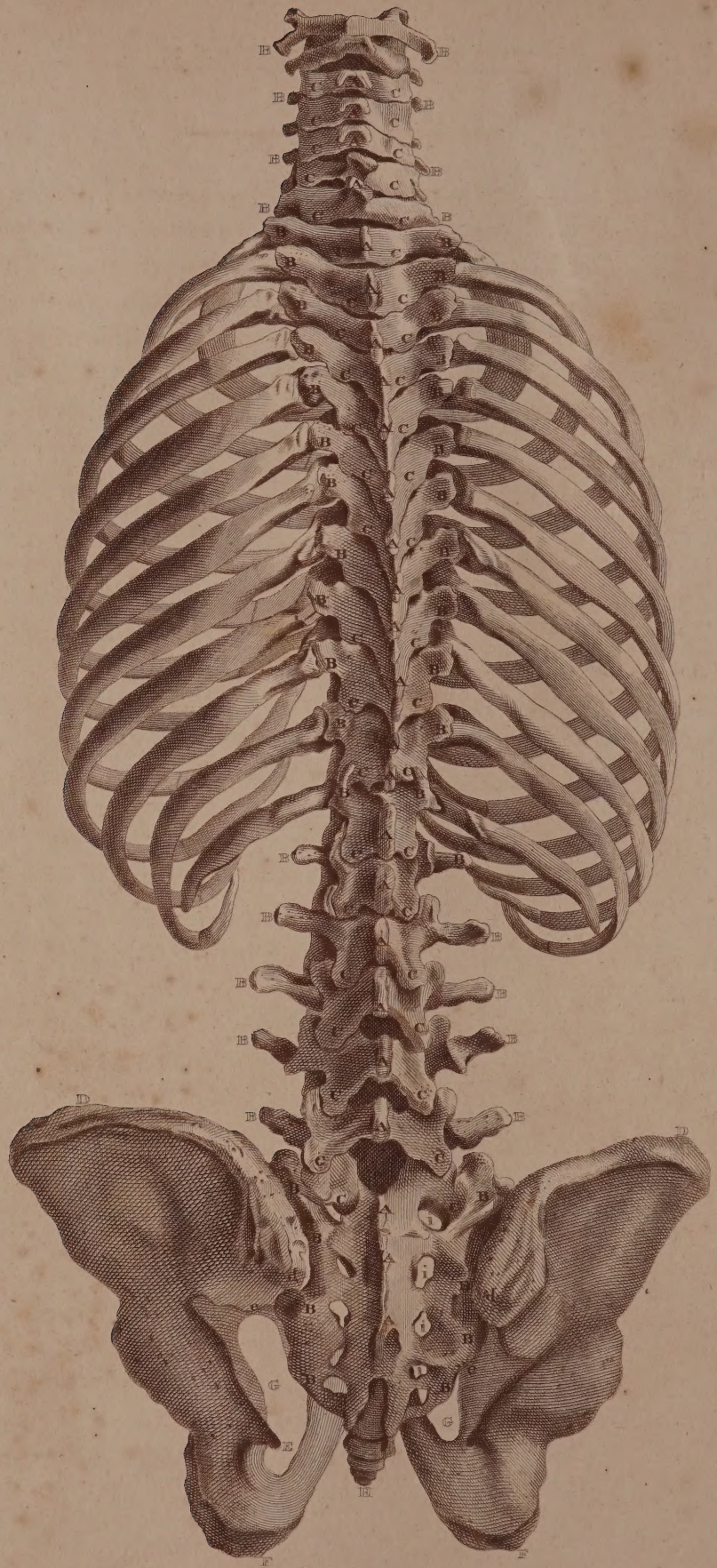
The Transverse Lines in the Middle Bone of the Sternum, show the junctions of the four separate Bones of which it is composed.

The Clavicle of the Right Side is here seen through its whole extent, articulated with the Acromion process of the Scapula at A, and crossing the Coracoid process of the same Bone at B. The superficial, or Glenoid Cavity of the Scapula, in which the Head of

PLATE XI.—*Continued.*

the Humerus moved, is seen at C. Its inferior, or Sacral Costa, at D. Its Base, at E. Its superior, or Atlantal Costa, is concealed.

In the lateral Bones of the Pelvis, the Crest of the Ilium is seen at FF. Its anterior and superior Spinous process at G. Its anterior and inferior Spinous process at H. The Os Pubis at I. The Symphysis Pubis at K. The Tuberosity of the Ischium at L; and its Spinous process at M. The Acetabulum or Cavity, in which the Head of the Femur is lodged, may be seen at N. This Cavity is formed of the Ilium, Ischium, and Os Pubis. O, shows the Foramen Obturatorium, formed by the Os Pubis and Ischium; and P, the Notch, called Sacro-Ischiadic.



E. Mitchell Sculp.t

PLATE XII.—From SUE.

The DORSAL ASPECT of the TRUNK.

AAA The Spinous processes of the different Vertebræ, the Spinous processes of the Cervical Vertebræ, with the exception of the first and the last appearing bifurcated

BBB The Transverse processes of the Vertebræ

CCC The Oblique, or Articular processes of the Vertebræ

DD The Crest of the Ilium

dd Its Posterior and Superior Spinous process

ee Its Posterior and Inferior Spinous process

E Spinous process of the Ischium

F Its Tuberous process, or its Tuberosity

G Sacro-Ischiadic Notch

H Os Coccyx

I i Dorsal Foramina of the Os Sacrum, for the transmission of Nerves and Blood-vessels

PLATE XIII.—From SUE.

The Vertebral Column, with its four Curvatures, falling alternately sternad and dorsad of the centre of gravity. These Curvatures, when viewed along with the inflections of the Sacral Extremities, that are alternately rotulad and poplitead, or forwards and backwards, from the Hip Joint to the Toes, show how the animal that walks erect can thus more easily preserve its balance.

The Ribs, Extremities, and other parts situated Laterad of the Mesial Plane, supersede the necessity of such Curvatures and Inflections towards Right and Left. But the Curvatures of the Column are wanting in animals accustomed to move with the body horizontally, as not being necessary in that position to preserve an equilibrium; while diseased Spines of the human species, when bent to one side, have, by way of compensation, a correspondent Curvature on the other.

The Transverse processes of the different Vertebræ are seen distinctly in the Front View, Fig. 1, at AA, and the Spinous processes in the Lateral View, Fig. 2, at BB. The Spinous processes of both the Cervical and Thoracic Vertebræ showing a greater inclination sacrad than those of the Lumbar, some of which appear even to incline atlantad.

Upon a comparison of the Vertebral Columns of different species, the processes, when inclined, seem to be inclined to that point, or to those points where the Column is most frequently or extensively inflected, as may be seen in the skeleton of the Dog, and in a variety of other quadrupeds, in which, not only the Spinous processes, but the Transverse processes of the Lumbar Vertebræ, upon one side, and the Spinous processes of the Dorsal Vertebræ, upon the other, are seen inclined, though in opposite directions, towards a Point or Centre of Motion, that is near to the last of the false Ribs but one.

In several quadrupeds, where the neck is long and the head heavy, as, for instance, in the Deer ornamented with horns, the Sacral inclination in the Spinous processes of two or three of the most atlantal of the Dorsal Vertebræ is less marked than in the Spinous processes that follow; and from this circumstance, that the first are near a Centre of Motion towards the Sacral Extremity of the Neck, and on which the Neck, along with the Head, is not only frequently, but extensively inflected.

In like manner, from the inflections of the Vertebral Column in the human species, near to the last of the false Ribs, and from the inflections which also take place near to the Head of the Os Sacrum, the inclinations of the Spinous processes of the Lumbar Vertebræ, as situated between two Centres of Motion, are less distinct than they are in quadrupeds, where the Spine is inflected extensively and frequently, and more decidedly upon one point.

In both Figures are seen at EE, towards the extremities of the Transverse processes, certain Pits or Depressions, corresponding to the smaller Heads of the Ribs with which they were articulated; and at FF, Fig. 2, Lateral depressions in the bodies of the Vertebræ, where the larger Heads of the Ribs were articulated. All these depressions, excepting the first and the two last, being opposite to intervertebral spaces, and a like mechanism being observed in quadrupeds and birds, curiosity becomes naturally excited to know the

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PLATE. 13.

F. Mitchell sculpt

reason. But without pretending to assign every cause, as there may be more causes than one, it is obvious, that the vertebral extremities, from resting opposite to the centres of motion on which the contiguous Vertebræ move, must be less disturbed, in their functions and relative positions, by the inflections of the Vertebral Column, than if they were attached like the first and two last, each to the body of a single Vertebra, and compelled to follow it in all its movements.

The letters CC show the Foramina through which the nerves issue from the Spinal Marrow to supply the Neck, Trunk, and extremities. These Foramina are formed by the junction of two notches belonging to the contiguous Vertebræ. Each Vertebra has therefore a notch upon its atlantal and its sacral aspect, and the notch will be largest on that aspect where the nerves press most, that is to say, on the atlantal aspect of the Cervical Vertebræ, where the nerves press as they pass to the Trunk and Atlantal Extremities, and on the sacral aspect of the Thoracic or Dorsal Vertebræ, where they likewise press in passing obliquely atlantad to the ribs. In the Cow, sometimes the notch found in the sacral aspect of these Vertebræ is so very deep, that the whole passage for the nerve seems formed in it; nay, in some of the Vertebræ, the notch at times may be seen converted into a canal, and the nerve issuing through the body of the Vertebræ, instead of the intervertebral space.

A difference also may be observed between the atlantal and the sacral notches of the Lumbar Vertebræ, but not so well marked as in the Vertebræ of the Thorax and Neck.

In the Os Sacrum, the Foramina for the nerves are not found on the Lateral, but upon the Sternal and the Dorsal Aspect, as the nerves could not well pass out laterally through the junction of the Os Ilium and Sacrum, nor between the transverse processes of the Sacrum, which are closely united by ossification. In old draught horses, where the transverse processes of the Lumbar Vertebræ, like those of the Sacrum, are frequently united by ossification, we see the Foramina for the passage of the nerves, in the same way as they are in the Sacrum, instead of opening dextrad and sinistrad, opening regularly sternad and dorsad.

The size of these Foramina, it should also be observed, is not wholly regulated by the size of the veins, arteries, or nerves, that are seen to pass through them, but partly also by the range of motion to which these are subjected, arising either from inflections of the Spine, or changes of position in the several organs on which they are ramified.

PLATE XIV.—From SUE.

Containing different Views of Cervical, Thoracic, and Lumbar Vertebræ.

A The Body of each Vertebra
BB Its Transverse Process
CC Its Oblique or Articular Processes
D Its Spinous Process
E Denoting that it is seen from the Atlantal or Superior Aspect, and
F From the Sacral or Inferior Aspect

In the middle row are three views of the Atlas, or first Vertebra of the Neck. This Vertebra has not a body that resembles, either in size or form, any of the rest, and therefore by some is said to want a body entirely.

In Fig. 1. it is seen from the Aspect where it is articulated with the two Condyloid Processes of the Occipital Bone

In Fig. 2. —— from the Sacral Aspect, where it is articulated with the Vertebra Dentata

In Fig. 3. —— from the Dorsal Aspect, where it exhibits, on the inner side of the body, A, the depression, b, where it was articulated with the Toothlike Process of the Vertebra Dentata

Fig. 4. The Vertebra Dentata, from the Atlantal Aspect. d, Its peculiar process, called Processus Dentatus. This process, passing atlantad through the ring of the Atlas, becomes the axis, round which the Head, along with the Atlas, are observed to move in their rotatory motions. It is retained in its situation by a transverse ligament passing behind it from one side of the Atlas to the other.

Fig. 5. The Atlas and Vertebra Dentata, seen in connexion from their Sternal Aspect

Fig. 6. The same seen in connexion from their Dorsal Aspect

Fig. 7. The Vertebra Dentata, seen unconnected, from its Lateral Aspect

Fig. 8 and 9. Two views of one of the Thoracic or Dorsal Vertebræ, towards the Atlantal Extremity of the Trunk

Fig. 10 and 11. Two Views of another Vertebra of the same order, towards the Sacral Extremity of the Trunk. These two Vertebræ are brought into comparison to show that their bodies are gradually enlarged, as they recede from the Cervical Vertebræ, and approach towards the Lumbar.

From this difference in the size of their bodies, Dr Monro takes one of the characters by which he distinguishes the different Vertebræ, though a character thus founded on comparison be of no use when the comparison cannot be instituted. A more obvious character may be derived, and has been derived, from the aspects of their articular surfaces. In the Cervical Vertebræ, these point Atlantad and Sacrad; in the Thoracic, Sternad and Dorsad; and in the Lumbar, Dextrad and Sinistrad. Yet even this character has been found imperfect; for towards the Sacral Extremity of the Neck, the articular surfaces begin to point, like those of the Thoracic, towards the Sternal and the Dorsal Aspect. At the same time, in directing our views to the more varied and extensive field of comparative anatomy, it soon appears that no common or general characters, distinguishing these classes of Vertebræ, are to be found in either their forms, their relative magnitudes, or their number of processes,—every order and genus

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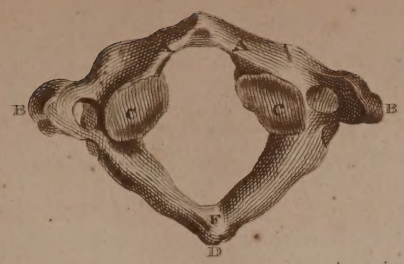

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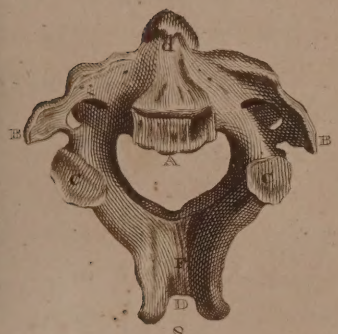

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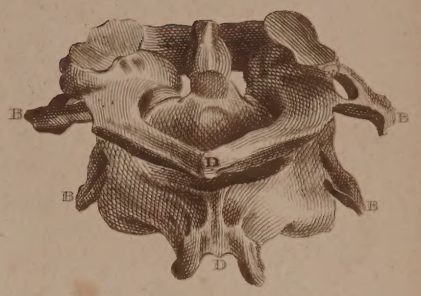

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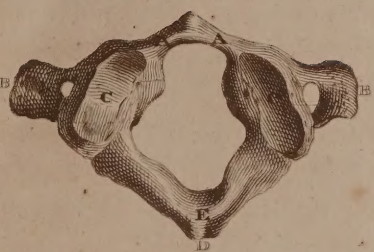

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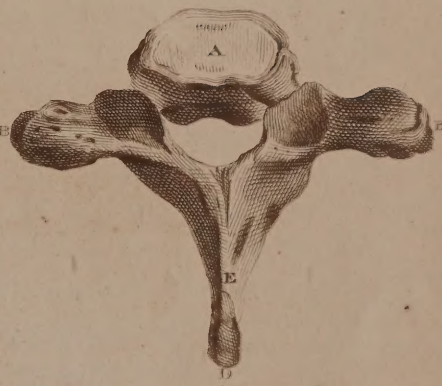

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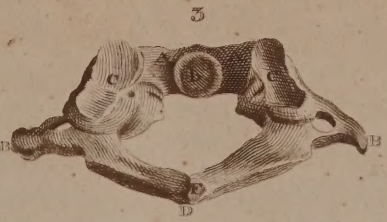

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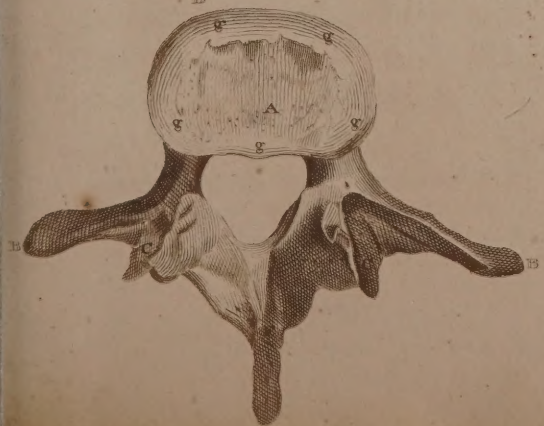

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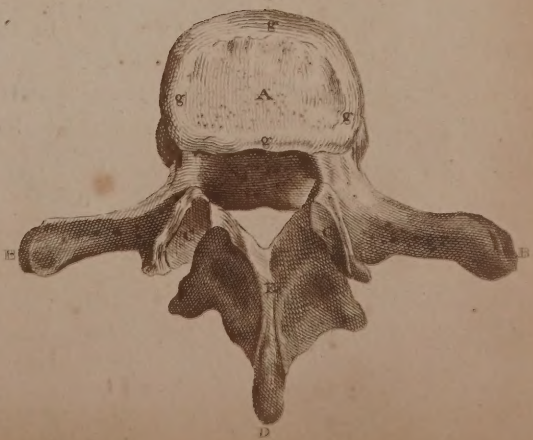


of animal exhibiting many and obvious diversities in these respects; diversities, indeed, that contribute much to facilitate zoological arrangements, though they rather tend to confound the anatomist in trying to discover general characters for distinguishing the different classes of vertebræ in different animals. Some characters, however, may be found; for not only in man, but in quadrupeds and birds, whatever may be the forms of their vertebræ, their relative magnitudes, or their number of processes, their cervical vertebræ seem to be distinguished by perforations in their lateral aspects for the transmission of vertebral arteries; their thoracic vertebræ by articular surfaces, either on their sides or their transverse processes, where they join with the ribs; and their lumbar vertebræ, by neither perforations on their lateral aspects, like the cervical vertebræ, nor articular surfaces, like the thoracic.

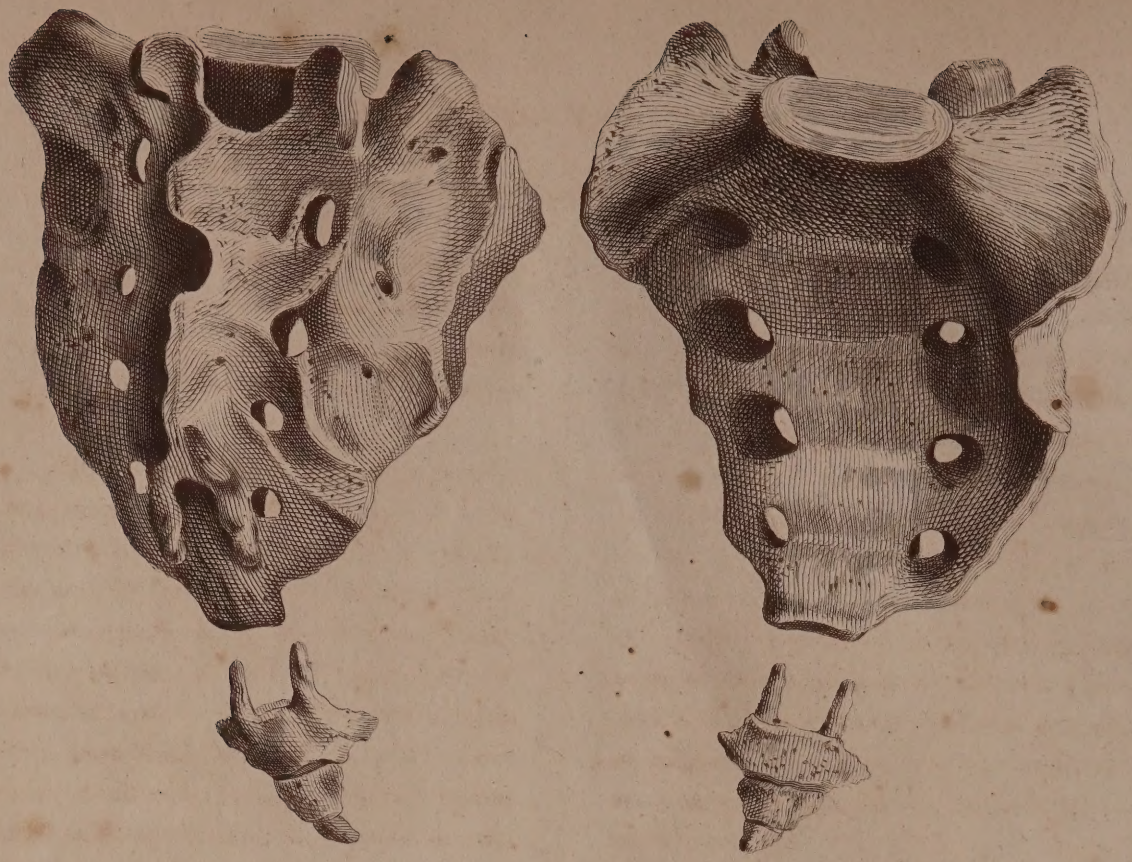
If some, occasionally, of the cervical vertebræ, towards the sacral extremity of the neck, be without perforations in their transverse processes, they may, notwithstanding, be easily distinguished from lumbar vertebræ by the small extent of lateral projection in their transverse processes. On the other hand, if the transverse processes of the lumbar vertebræ in the feathered tribes usually present articular surfaces from their connexion with the Ossa Ilia, that extend atlantad as high as the ribs, their articular surfaces are easily distinguished from those by which the thoracic vertebræ are joined with the ribs, and independent of form and magnitude, as easily distinguished from a few of the last thoracic vertebræ in cetaceous animals, that have the ribs articulated only with the extremities of their transverse processes.

Fig. 12 and 13. Two Views of a Lumbar Vertebra.

In this Vertebra may be seen, more distinctly than in the preceding, a sort of ring, gg, resting upon the body of the Vertebra, and to which the intervertebral ligament was attached. This ring is of a denser or closer texture than the substance of which the body is composed. In young animals it is easily separated by maceration in water, and at that period is what anatomists term an Epiphysis.

Within the ligament is found a mixture of ligament and cartilage, which, as it proceeds inwards to the centre, gradually passes into a sort of a glairy matter. From the nature of this intervening substance, the contiguous vertebræ reciprocally move upon one another with very little friction; and in order to contain it in the greater quantity, the atlantal and sacral aspects of the vertebræ present superficial or glenoid cavities. When this intervertebral substance is compressed, the bodies of the vertebræ approach nearer, and the length of the column is somewhat diminished: in man, who preserves it erect through the day, it is shorter in the evening than it is in the morning. But in old age, when the fluids that supply it become scanty, it decreases in bulk, and the bodies of the vertebræ approach so near, that the column not only becomes shorter, but is bent forward,—a circumstance usually remarked by anatomists. The same kind of articulation, though not followed by the like consequences, is carried much farther in the order of fishes, where a thinner fluid is contained between the vertebræ in two hollow cones, united at their base by means of an intervertebral ligament. These cones are formed in the bodies of the vertebræ; and each vertebra has therefore two cones, one in each of its opposite aspects, atlantad and sacrad. A ball and socket-joint of a different kind, less moveable, but certainly stronger, may be observed in the neck of the horse and

the vertebral columns of land serpents: the balls and the sockets are there formed entirely of bone; each vertebra exhibiting a ball on one of its aspects, and a socket on the other, to receive the ball of the vertebra that follows. A third kind of articulation, between two contiguous vertebræ, may be observed, between some of the last of the coccygeal, in the horse, the dog, and other quadrupeds, as well as in cetaceous animals. These vertebræ present to one another, convex surfaces, of which only a very small portion can be brought into contact at the same time.



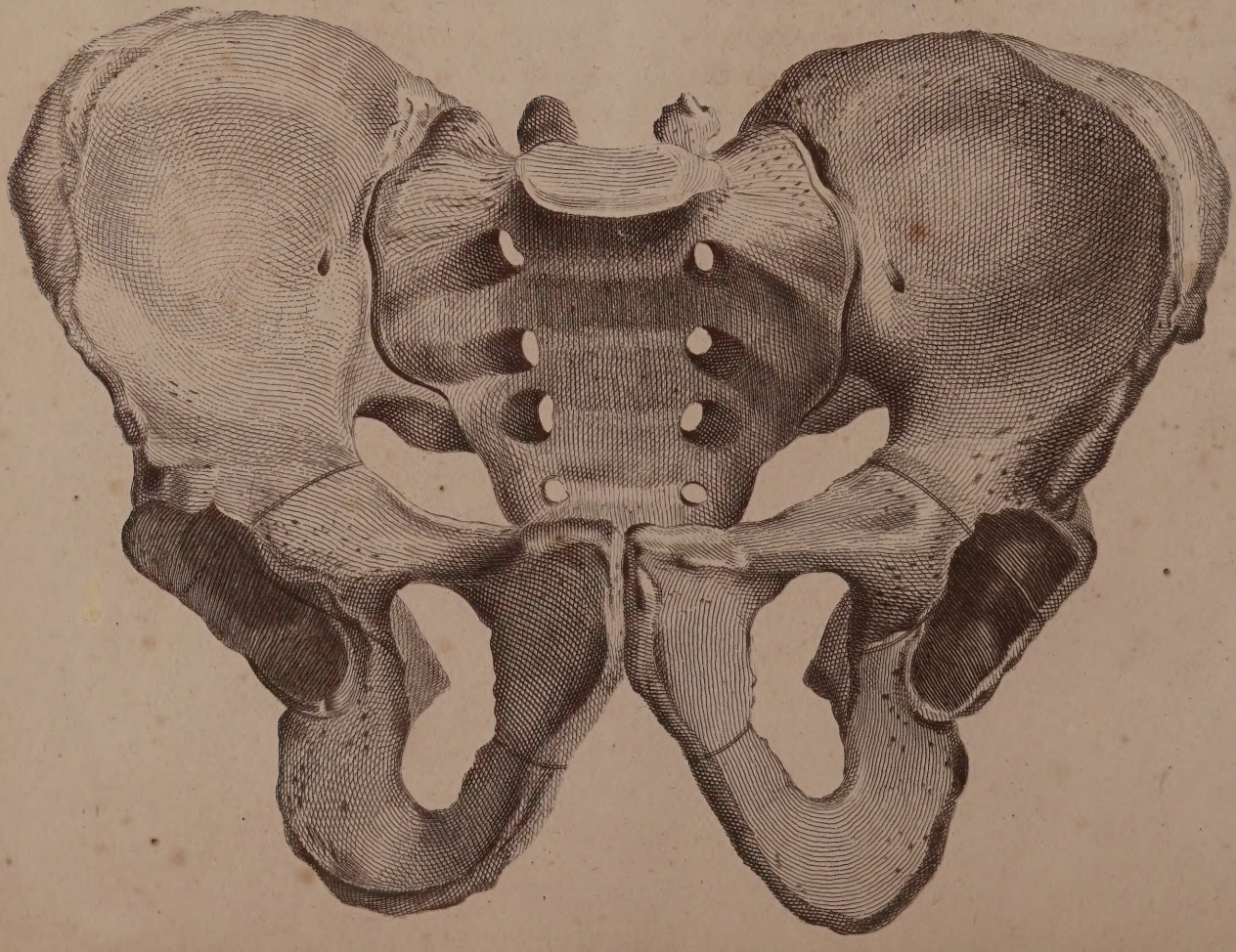


PLATE XV.—From SUE.

This Plate presents nothing new of any importance, in addition to what has already been seen in connexion with the Trunk and the Vertebral Column. The view of the Pelvis, and the two views of the Os Sacrum, are exhibited only on a larger scale. The two small Figures representing the Sternal and Dorsal aspects of the Os Coccyx, consist here only of three bones, although the number be frequently four. In the human body, it narrows the lower aperture of the Pelvis, and thereby contributes to support the Viscera. In youth, it is pliable, in old age, rigid, and sometimes ossified through its whole extent, when those muscles, called Coccygeal, can have no effect in changing its position. Its Vertebræ are distinguished from those of the Column, by not being perforated for the transmission either of Nerves or of Spinal Marrow. In many, however, of the lower animals, a number of its Vertebræ towards the Os Sacrum have a passage for the Nerves of the Cauda Equina, and not only Spinous, but even Transverse and Articular processes, resembling those of the Lumbar Vertebræ. In these animals it is termed the Tail, and as that generally tapers to a point, those Vertebræ which resemble the Lumbar, differ from them also in one respect, that their bodies are narrower or of less diameter at one extremity than at the other, while the following Vertebræ, towards the Apex, are without perforations and articular processes.

In some animals, as for instance the Rat, and those which, in some Zoological arrangements, are termed Monkies, this Coccyx or Tail is longer than the Body, while, in others, it is found not proportionally longer than it is in Man; and in the Frog, wanting entirely. But its form and its length are not only various in various animals, but its uses almost as various as its forms. By some employed as a weapon of defence, to protect themselves against troublesome insects. By some as a hand to lay hold of objects, as Monkies employ it when suspending their bodies from the branches of trees. By Lizards and Serpents as a kind of pole, to assist in pushing their bodies forward. By Birds, as a rudder to regulate their motions upwards and downwards when flying in the air. By the Beaver, as a trowel in carrying and preparing mortar for his buildings. By the Kangaroo, as a kind of support when he is resting, and an instrument of motion when he is leaping.

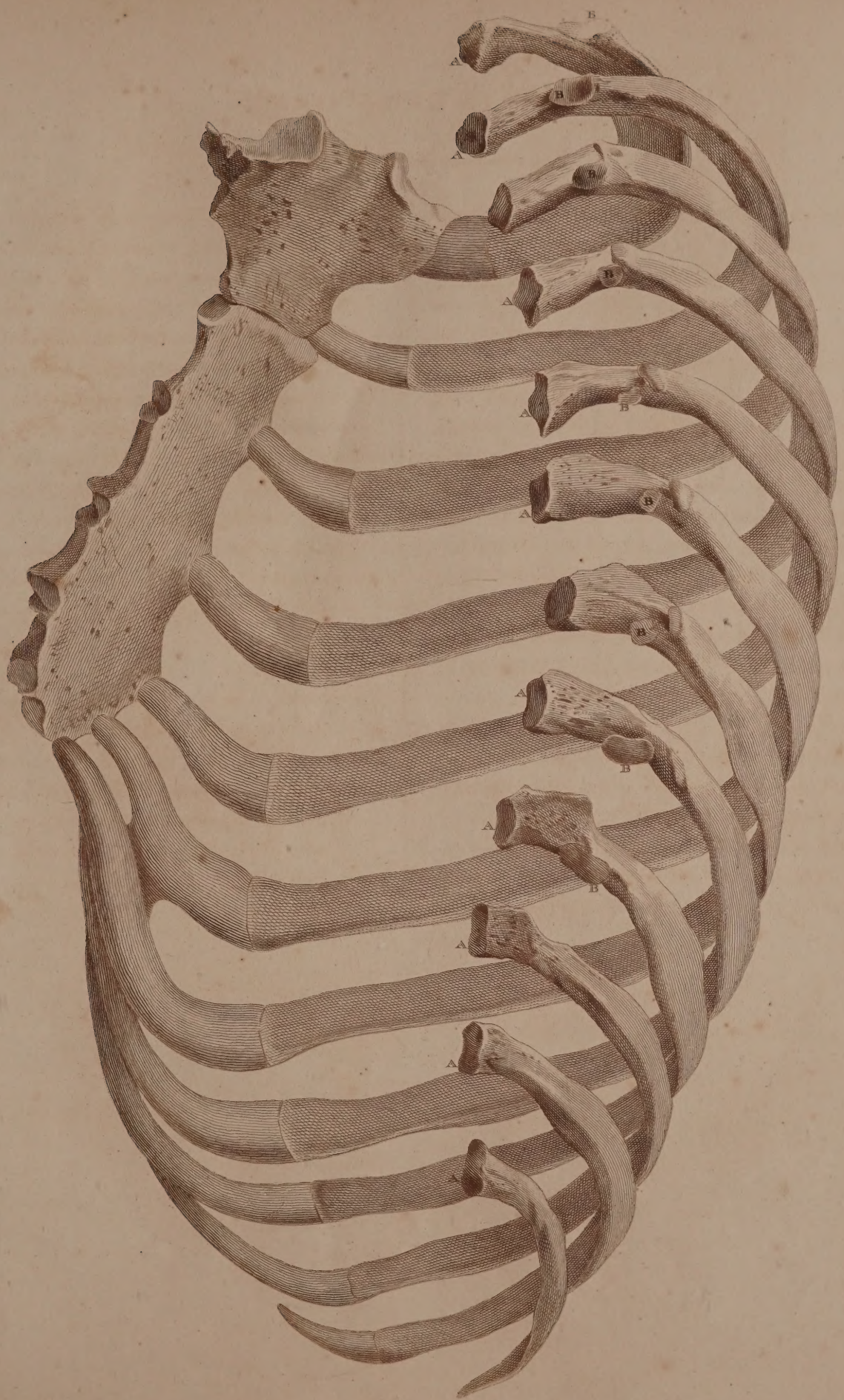
PLATE XVI.—From SUE.

This representation of the Ribs and Sternum, though well designed, and even well executed, has, notwithstanding, from the unavoidable imperfection of the art, fallen short of nature. All the Ribs have two sides, and also two edges or margins, but all the corresponding sides and margins have not, as in this Figure, the same aspects. The first Rib, from being more horizontal than the rest, has its edges pointing peripherad and centrad, or outwards and inwards, while its sides point atlantad and sacrad, or upwards and downwards. The second Rib is somewhat intermediate between the first and the rest that follow, which, instead of their edges, have their sides pointing peripherad and centrad, and their edges pointing atlantad and sacrad. The cartilages of the two last are isolated, not connected either with the rest, or the sternum.

All of them are more or less moveable on the Vertebral Column; and the most atlantal being the most fixed, the rest, during the time of inspiration, are rather drawn more towards them, than they towards the rest. The atlantal, besides, from being nearer, not only to the apex, but the axis of the Cone, it follows that the rest must necessarily be drawn in a direction atlantad and centrad, or upwards and inwards, which explains how the margins that point atlantad, are also observed to point a little centrad or inwards. From this compound motion, the Ribs are observed to roll a little on their Vertebral extremities, which rotatory motion being prevented at the opposite extremity by the Cartilages of the Sternum, several of the long Ribs in time become twisted, a twist which is increased by the differences of resistance which they have to encounter towards their extremities and that part of their Curvature where they happen not only to be more moveable, but where the muscles are enabled to act with the greater force, as possessing a more advantageous lever.

A Shows the Heads by which they were connected with the bodies of the Vertebræ

B The smaller Heads by which they were articulated with the Transverse processes. The space intermediate is termed their Cervix, while the place where they exhibit a sudden or rapid change in their Curvature, is termed their Angle.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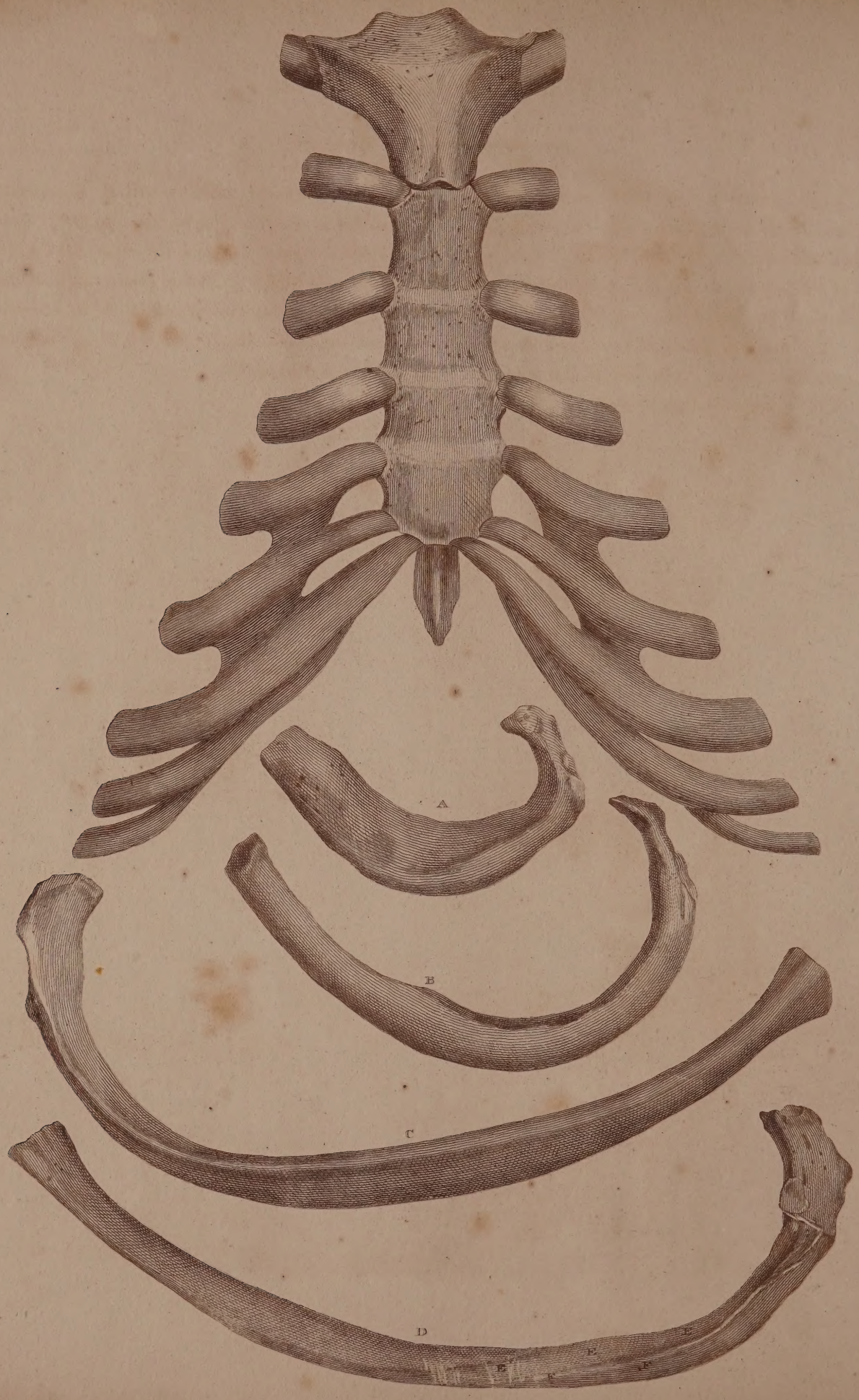
A
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E

PLATE XVII.—From SUE.

This Plate exhibits a view of the Sternum, of the Cartilages of all the true Ribs, with the Cartilages of the first and second of the false Ribs. A view, likewise of the first and second Rib of the left Side, and two views of the last of the true Ribs on the right Side. The first and second Rib, marked A and B, are seen from above. The last of the true Ribs, marked C, principally from without, or from its convex side; and the same marked D, principally from within, or from its concave side. In both views there is an attempt to represent the twist mentioned in the references to the preceding plate. And in Rib D, may be seen the Groove EEE, on its concave side, near the Sacral Margin FF, where lay the intercostal artery and nerve.

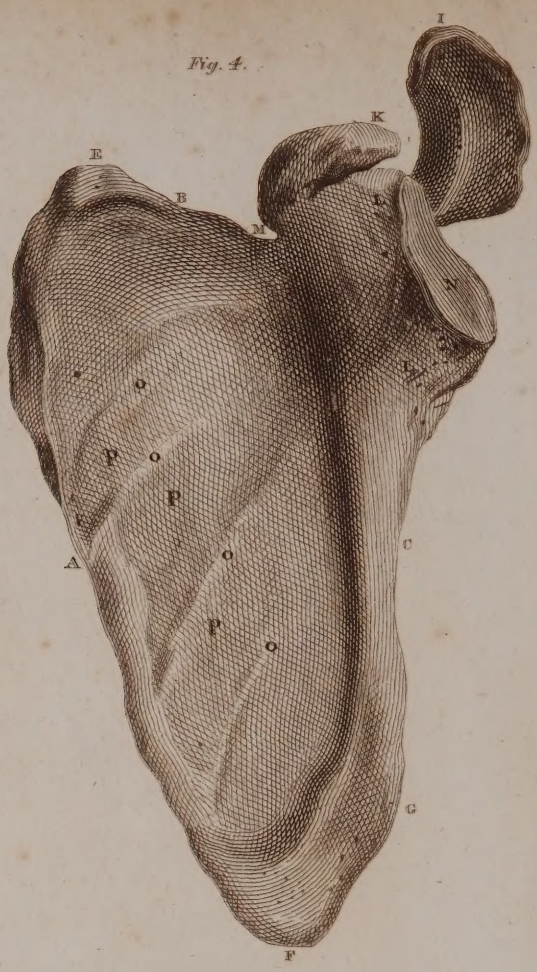
Fig. 4.
I
K
E
B
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L
o
P o
P
L
A
C
o
P o
C
F

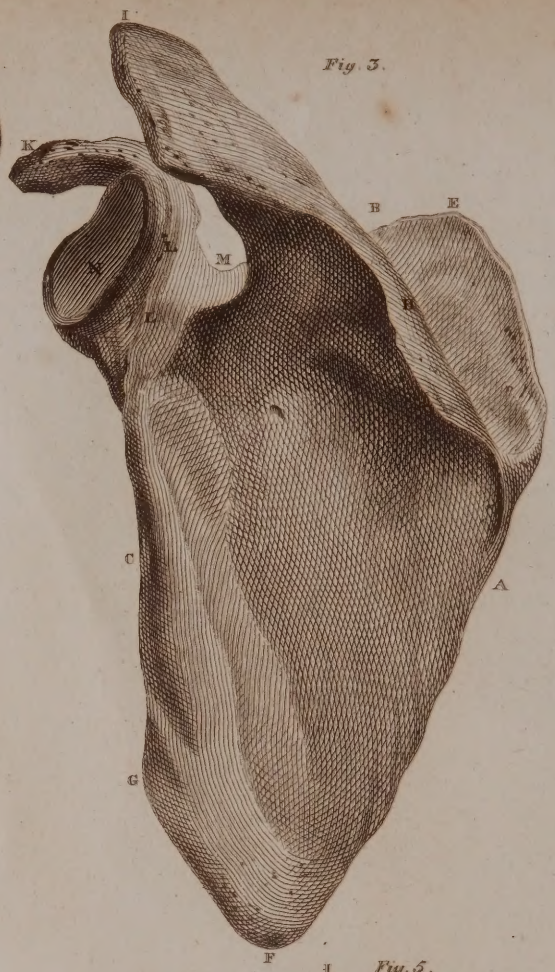
Fig. 3.
I
K
B
E
L
N
M
L
C
A
G
F

Fig. 5.
I
K
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Fig 1.
D
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E
C

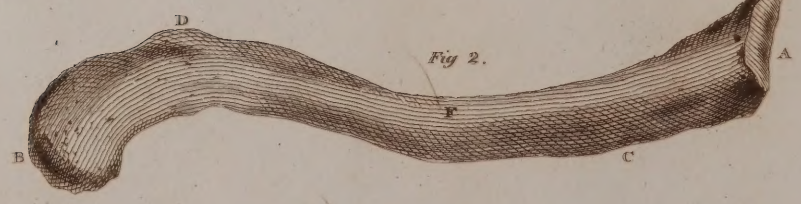


Fig 2.
D
A
F
B
C

PLATE XVIII.

FIG. 1, 2.

VIEWS OF THE LEFT CLAVICLE.

THE clavicles are bones which stretch between the sternum and scapulæ. Such bones are regularly found in the human species, in all birds, and in those quadrupeds which extend their atlantal extremities laterally, or which can employ them in some measure as we do our hands. In other quadrupeds they are either wanting, or their place is occupied by something appearing in the form of a cartilage, in the form of a ligament, or in the form of a small bone imbedded transversely in the body of a muscle, which corresponds somewhat in function to what we denominate, in the human species, the *Cleidomastoid.*

Fig. 1. Is a view from before and above, or from the sternal and atlantal aspect.

Fig. 2. A view from before and below, or from the sternal and sacral aspect.

A, The extremity connected with the sternum is somewhat rounded in the form of a cylinder

B, The extremity connected with the scapula, considerably flattened.

As the whole has somewhat the form of an italic *S*, bending alternately forward and backward, or sternad and dorsad, the first curvature, C, in proceeding from the sternum, is convex forward, and the next, D, towards the scapula, convex backward.

Of the two aspects,—the one pointing atlantad or upward, and the other pointing sacrad or downward, —E, the first, is a little convex, and F, the second, a little concave. Without attending to this last distinction, which cannot be well seen in the engravings, the left clavicle may not unfrequently be mistaken for the right, and *vice versa.*

FIG. 3. 4. and 5.

VIEWS OF THE SCAPULA OF THE LEFT SIDE.

The scapula, when viewed from either the peripheral or central aspect, as in figures 3, and 4, has somewhat the form of a scalene triangle. Of which the side,

A, Is termed the base.

B, The superior or atlantal costa, and

C, The inferior or sacral costa.

The superior costa, meeting the base at

E, forms what is called the superior or atlantal angle; while the inferior costa, meeting the same at

F, Constitutes the inferior or sacral angle. This last costa is very generally, though not always, inflected a little from its previous direction at the point, G, before it reaches the base at F.

H The ridge on the convex or peripheral aspect of the scapula, which is named its spine.

I, The termination of that ridge at the extremity farthest from the base, is what has been called the acromion process, or simply the acromion, a word of Greek origin, which literally signifies the top of the shoulder.

K indicates the process which is named coracoid, another word of Greek origin, implying something that is like a crow, but restricted by anatomists to signify something that resembles only the beak of a crow, and the beak of a crow only in its form. This coracoid process originates in

L, the part which is termed the head of the scapula,

M, The supra-scapular notch, forming a part of what is called the neck or cervix of the scapula. This notch is destined for the transmission of an artery and nerve; in the recent subject, a ligament is observed extending across it, affording support to the parts above, and protection to the parts be-

neath; Sometimes the ligament is converted into bone, when, instead of a notch, we observe a perforation; Sometimes, again, the superior costa converges so gradually towards the base of the coracoid process, that we observe neither a notch nor a perforation.

N The superficial cavity in the head of the scapula, which anatomists have chosen to denominate the glenoid or the eyelike cavity. It is destined to receive the head of the humerus, and, in the human species, is always of an ovate form, an appearance which is best seen in Fig. 5.

The ridges and depressions marked o. p. are owing partly to the actions of the *subscapular muscle.* Similar appearances, but not so conspicuous, may sometimes be seen on the opposite aspect, occasioned by the muscle called the *infraspinatus.* In aged individuals, the bone in some places becomes so thin between these muscles, as to be diaphanous; and even some scapulæ exhibit perforations, where the osseous matter had been quite absorbed, and nothing left interposed between the muscles except the periosteum.

Fig. 5. A view from the head towards the base, and from the sacral towards the atlantal costa.

Though the scapulæ of quadrupeds, like the human scapulæ, be generally of a triangular form, yet that form exhibits varieties in different genera, and furnishes a number of distinctive characters of use to the naturalist; besides, though these scapulæ have all a spine, yet many of them want a coracoid process, and an acromion. The spine, at the same time, has different directions in different genera, and exhibits in some, as for instance in the elephant, peculiar processes. The scapula of the ursus meles, or badger, is among the few exceptions to the triangular form; it is nearly quadrangular, and its spine is observed extending diagonally, from corner to corner.

Fig.1.

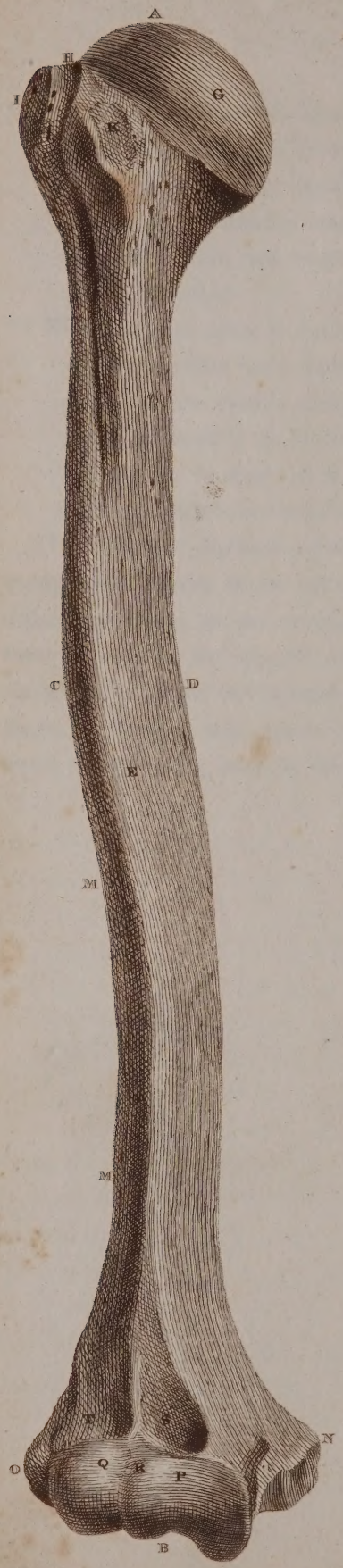


Fig.4.

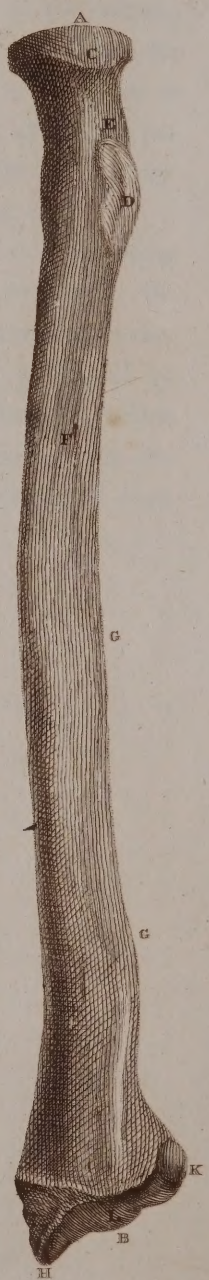


Fig.3.

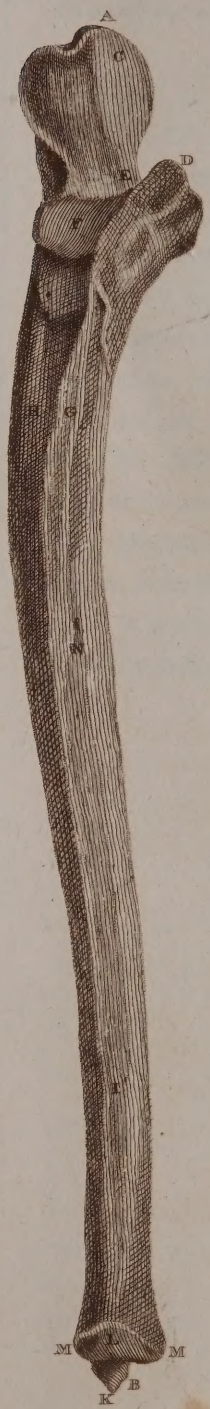


Fig.2.

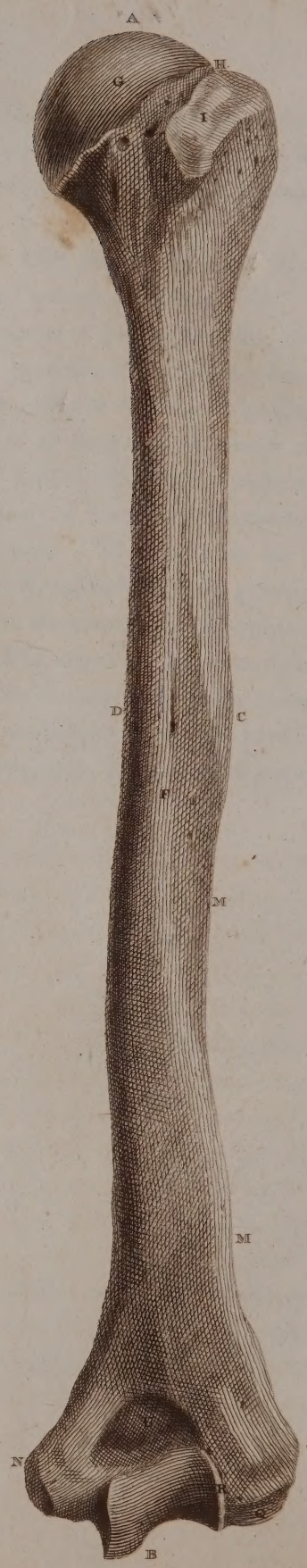


PLATE XIX.

FIG. 1, 2.

TWO VIEWS OF THE RIGHT HUMERUS.

A, The proximal extremity.

B, The distal extremity.

C, The radial aspect.

D, The ulnar aspect.

E, The thenal aspect.

F, The anconal aspect.

G, The head, exhibiting the articular surface presented to the scapula, is in form hemi-spherical; and therefore its shape not regulated by the glenoid cavity of the scapula, which is ovate, but defined by the extremities of the coracoid process and the acromion, which enter into the formation of the shoulder joint.

H, A slight depression, denominated the neck or cervix of the humerus, between the margin of the articular surface, and

I, The larger tuberosity of the humerus, into which are inserted the muscles called the *supraspinatus*, the *infraspinatus* and the *teres minor*. The two last confined almost entirely to rotatory motion outwards, or radiad.

K, The smaller tuberosity for the insertion of the *subscapular muscle*, which, as an antagonist of the *infraspinatus* and *teres minor*, rolls the humerus inwards, or ulnad.

L, Fig. 1, A groove between these tuberosities, termed the bicipital, from lodging the tendon of a muscle called the *biceps flexor cubiti*.

From the head or neck, to C, D, the humerus is somewhat convex on its thenal aspect, and from that point to its distal extremity somewhat concave: these appearances, however, not easily observed in the Engravings: it is also concave at

MM, On the radial aspect: this concavity commences at

D, On the ulnar aspect, and is continued across the anconal in a spiral direction towards the radial: it indicates the course of the radial nerve, and an artery which accompanies it.

In approaching towards its distal extremity, the humerus is flattened between its thenal and anconal aspects, and widened between its radial and ulnar. On each of the two last aspects it exhibits a ridge or spine—the one on the ulnar aspect, terminating in

N, Or in what is called the ulnar condyle—the other in

O, Or in what is termed the radial condyle. The articular surface marked P Q R, is named the trochlea or pulley;

P, The hollow part on which the ulna moves;

Q, The convex part on which the radius moves; and

R, An eminence interposed between them.

S, A depression, corresponding to the coronoid process of the ulna when the fore arm is in a state of flexion.

T, Another depression corresponding to the head of the radius when in a state of flexion.

U, A depression on the anconal aspect, which receives the olecranon or head of the ulna, when in a state of extension. In man frequently the bone is diaphanous between this and the opposite depressions, and in some few the osseous matter is entirely absorbed—an appearance not uncommon in the feline tribe and some other animals.

V, Fig. 2. The appearance of the passage by which the medullary artery penetrates the bone: But I have never seen the artery entering so near to the proximal extremity, nor entering, as here, from the anconal aspect: it most commonly en-

ters from the thenal aspect, and nearly the situation of V, Fig. 1.

FIG. 3.

Is a view of the ulna of the right side from the thenal aspect. The term ulna is derived from the Greek word ωλενη, which signifies the arm, hence Λευκωλενος Ηρα, the white armed Juno. It was used by the Romans to signify a measure equal to an arm's length, and hence the English word ell: With anatomists it signifies that bone of the fore arm which is on the same side with the little finger. At its proximal extremity, A, is the process.

C, Termed the olecranon, the ωλενης κρανον, or head of the ulna in which the anconei, or extensor muscles of the αγκων, or elbow joint, are inserted. At

D is seen the coronoid process, in which the *brachieus internus*, a flexor muscle of the joint, is inserted. Between the extremities of these two processes is the sigmoid, or semilunar cavity,

E, exhibiting an articular surface, corresponding to the ulnar part of the trochlea which is seen in the humerus. At

F, Another articular cavity, in which the head of the radius rolled. Beyond these processes and articular surfaces, the bone for a while presents three sides, one of which, on the thenal aspect,

G, which is concave, on meeting with another, marked

H, which is convex, form between them an acute salient angle on the radial aspect, for the attachment of what is termed the interosseous ligament. Towards the distal extremity, at

I, The bone assumes more of the cylindrical form, and terminates ultimately in the slyliform process

K, and the transverse articular surface

L.

From the process K, a ligament extends to two bones of the carpus, the *cuneiform* and *pisiform*; but as the ulna itself does not reach to any bone of the carpus, a moveable cartilage is interposed between its transverse articular surface and the cuneiform bone. Another articular surface of an annular form, and surrounding the edge of the transverse surface, is imperfectly seen at

MM. This surface corresponds to a lateral cavity of the radius at K, where the ulna at times rolls upon the radius: not that the ulna has any rotatory motion of its own, but is forced to roll along with the humerus.

The letter N shews the passage by which the medullary artery enters the bone. The course of this artery, and the corresponding arteries of the radius, is recurrent, while the course of the medullary artery in the humerus is progressive. This difference, in the course of these arteries, has never been satisfactorily explained; and what adds to the difficulty of the explanation is, that the course is different in the corresponding bones of the atlantal and sacral extremities: In the humerus progressive, in the femur recurrent, in the radius and ulna recurrent, and in the tibia and fibula progressive. It, indeed, has been observed that, in a standing or a sitting posture, the position of the humerus, tibia and fibula, where the course is progressive, is somewhat perpendicular to the horizon, while that of the femur, radius and ulna, where the course is recurrent, is rather more in a parallel direction. But these temporary positions will not account for the course of the arteries, as that course had

received its direction before we were born, and before we were capable of sitting or standing. If the course, therefore, is to be referred to any positions, it should be to those which the bones had while they were in utero. As a means of remembering the particular course in these several bones, it may be observed, that it is progressive in the three bones which are inflected dorsad, or backwards, and recurrent in the three which are inflected sternad, or forwards. Aristotle, I think, was the first who remarked that, beginning from the trunk, the successive inflections of the bones which correspond in the atlantal and sacral extremities are in opposite directions, the humerus bending backwards, the femur forwards, the radius and ulna forwards, and the tibia and fibula backwards, and that inflections in the same extremity are found to be alternately backwards and forwards, or forwards and backwards. Comparative anatomy, so far as I know, has not been consulted to any extent with a view to throw light upon the course of these medullary arteries. So far as my inquiries have led me, I have met with nothing on which reason or judgment can repose with confidence. In referring it to a position of the bones while they were in utero, I naturally thought of the veins and arteries which are ramified on the testicles, and which have their origin as high as the kidnies, where the testicles had lain previous to birth.

FIG. 4.

A view of the radius of the left side from the thenal aspect. As the joint of the elbow owes more of its security to the ulna than to the radius, and the joint of the carpus more of its security to the radius than to the ulna, the ulna is observed to decrease gradually, and the radius to increase in its dimensions as they approach towards the carpus. The fore arm, therefore, throughout its extent, is nearly every where of an equal strength. Where the ulna has three sides, the radius is of a cylindrical form, and where the ulna becomes cylindrical, the part of the radius which is opposite to it becomes triangular.

In all birds, and in several quadrupeds, the radius is the smaller bone of the fore arm; yet, in all, it extends from the humerus to the carpus, while the ulna, in many species of quadrupeds, is not above half the length of the radius, and in some adheres to it merely as a process.

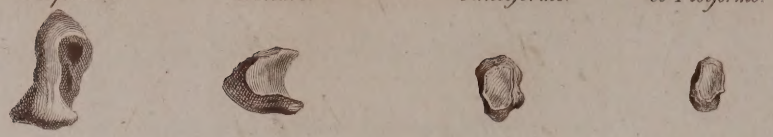
A, The proximal extremity of the radius. B, The distal. C, An annular articular surface which rolled in the lateral cavity of the ulna at F. The concave articular surface, corresponding to the convex trochlea of the humerus, is not seen. D, The tuberosity into which the tendon of the *biceps flexor cubiti* is inserted, a muscle which is not only a flexor of the elbow joint, but a supinator of the carpus, and an extensor of the humerus. E, Shows a space between the tuberosity D and the proximal extremity A, which is termed the cervix or neck of the radius. F, Shows the course of the medullary artery; and GG, the acute angle formed by two of the sides, and to which the interosseous ligament is attached. H, The styliform process, from which a ligament extends to the carpus. I, The articular surface, corresponding to the os scaphoides, and the os lunare of the carpus. K, An articular cavity corresponding to the annular articular surface of the ulna at MM.

PLATE XIX.—*Continued.*

At the distal extremity, and upon the anconal aspect of the radius, are several eminences and depressions which are not observable in this view from the thenal aspect. On the radial side of the anconal aspect is a depression for lodging the tendons of *the first and second extensors* of the thumb; ulnad of that, another depression for the tendons of the two *extensores carpi radiales;* ulnad of that again, a small eminence with a depression on its apex for the third *extensor* of the thumb; and, lastly, a fourth depression ulnad of the last, for the tendons of the *extensor communis digitorum manus.*

BONES OF THE CARPUS.

Scaphoides. *Lunare.* *Cuneiforme.* *et Pisiforme.*



Trapezium. *Trapezoides.* *Os Magnum.* *et Unciforme.*

Fig. 1.

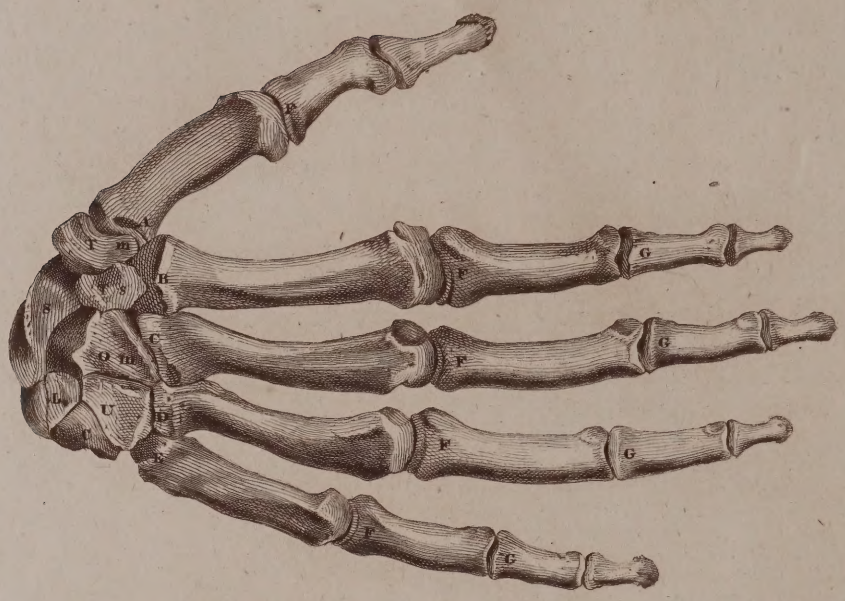


Fig. 2.

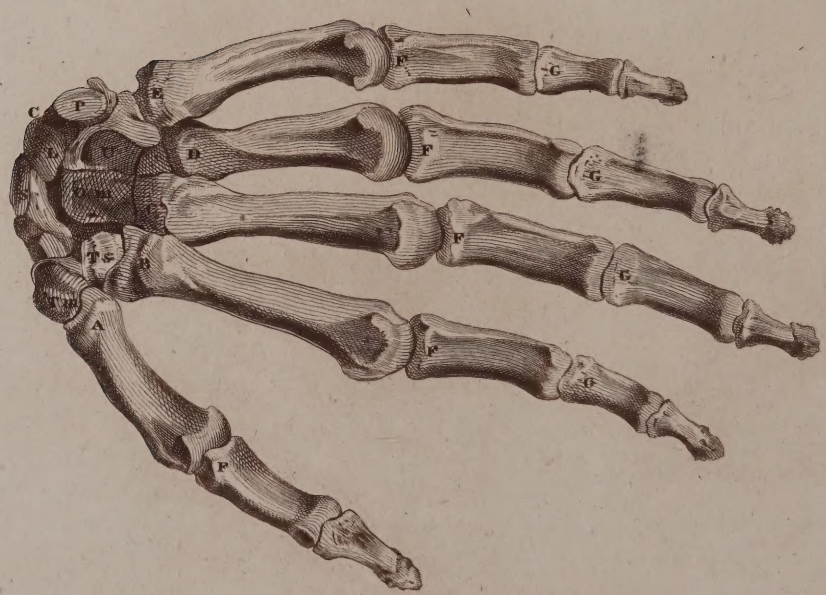


PLATE XX.

BONES OF THE CARPUS.

The carpus consists of a number of bones in two rows, each row in the human species consisting of four. Such a cluster of bones in man, and in quadrupeds of the larger size, is always found in connexion with the distal extremity of the radius; while in those animals that walk upon tiptoe, as the horse, the cow, the sheep, and the goat, it forms what is called the knee of the fore leg. To hazard a conjecture concerning the use of this cluster of bones, besides other uses mentioned by anatomists, it appears to be of essential service in diffusing the forces of pressure and percussion. Thus the force which impels a nail into a board, when its impulse is concentrated into a point, would have little effect upon the object against which it is aimed, were a substance or substances to be interposed, that by bulk, number, or elasticity, would rapidly diffuse it in a variety of lateral directions. Such is one of the important offices which the bones of the carpus seem to perform to the parts which are situated proximad and distad. For, if we attend either to their forms, or to the manner in which they are articulated, in the human hand, we shall find, that seldom can any force, ascending from the fingers, or descending from the radius, fall perpendicularly on any of their surfaces; embedded amidst elastic substances, receiving the impulse in a slanting direction, and yielding at the time that they receive it, they transfer it readily, without suffering an injury themselves, and without occasioning an injury to those with which they are connected, the bones in connexion being equally adapted to meet and diffuse a concentrated shock with the like safety and the like facility. Yet though such a cluster of bones may be requisite at the distal extremities of the radius and tibia, in the larger animals that walk on land, or that swim in water, where shocks are transmitted between heavy bodies and dense elements, which are not elastic,—it does not appear to be equally requisite in the feathered tribes, whose wings, in flying, receive the shock only from the soft and elastic air, while the natural lightness and buoyancy of their bodies may serve to explain why a single bone in their sacral extremities may answer all the purposes of a tarsus. A still greater lightness of body appears to supersede the use of a carpus and tarsus in insects, I mean here a carpus and tarsus in the sense of the anatomist, and not in the sense of the entomologist. The like reasoning, if we reflect on the habits of the animal, may serve to account for the numerous bones in the carpus of a mole, and also to explain why so few bones are to be found in the tarsus of a frog, compared with the number of bones in its carpus; the tarsus in this species of animal being the part which communicates the impulse, and the carpus one of the parts which receives it, not only when the animal springs to the leap, but when it alights from it.

Another way of diffusing the shock of concentrated forces, when it passes along the arm or the leg, is observable in the motions of the long bones. When a shock of this kind reaches the radius, after passing through the carpus, the radius instantly moves on the humerus, the humerus on the scapula, and the scapula upon the side of the trunk; each of these bones being found ready to move on the next, and the next to move upon the succeeding; while the succeeding, acting as a fulcrum to the one which precedes, is at the time moving on a fulcrum, which, as well as itself, is moving in a curve. Hence no force, in proceeding along the line of the extremities, can arrive at the trunk without altering its course at each articulation, and without passing through a number of curves; nor even when

it reaches the scapula or pelvis, can it enter the trunk without passing off, at nearly right angles, to what was the last of the numerous lines of its previous direction. Every person in the least acquainted with comparative anatomy must know, that when all the muscles are present, he can neither bend nor extend a joint in the wing of a bird, nor in the leg of a bird or a quadruped, without instantly bending or extending nearly all the rest at the same time. And hence it is, that animals, when alive, may fall from a height without an injury, where machines of their form, bulk, and weight, though constructed of iron, would be dashed to pieces.

In other cases, where the effects of pressure and percussion cannot be so easily or readily diffused, the mechanism of the animal structure to resist them appears to be not less ingenious and wonderful. In viewing the entire skeleton of an animal, in relation to the circumstances in which it had previously been destined to live, we find that all the parts are protected, not only in proportion to their vital importance, but in proportion also to the risk to which they are exposed; and that therefore all bones, in order to resist pressure and percussion, which come in a direction not to be readily or easily diffused, are observed to be generally convex on the aspect from which the shock was most likely to arrive. Besides, being either porous or hollow, they have increase of bulk without increase of weight, the requisite strength without being clumsy, and the requisite lightness without being feeble; a remark, I believe, for which anatomists were first indebted to the celebrated Galileo. In short, the mechanism of an animal body is not less wonderful than those admirable displays of wisdom by which its chemical processes are conducted, —displays which the ablest of our modern chemists are so far from being able to imitate, that there is not any who has yet been endowed with sufficient intelligence to comprehend them.

It was originally the practice with anatomists to distinguish the bones of the carpus by numbers,—a practice which, had they always agreed to commence their enumeration from the same bone, and to continue it in the same order, would have been attended with little inconveniency. But as that was not the case, Lyserus, an eminent practical anatomist, a native of Leipsic, and a pupil of Bartholin, who has written an excellent treatise on the art of dissection, invented the names by which they are now generally known. These names are in Latin; and, when made to form that rude verse which is seen accompanying the figures in the plate, may be easily remembered as well as the order in which they are enumerated. Lyserus, it appears, also intended that these names should be descriptive, but the description of a complicated form is not easily expressed in a single word; and besides, the ideas which he meant to communicate are conveyed by comparison, and by a comparison between objects where the analogy is extremely imperfect. The first bone of the proximal row, commencing from the radial aspect, he termed *scaphoides*, from its having some fancied resemblance to a boat. It has a concave articular surface on one side, and a convex articular surface on the opposite, the last surface divided longitudinally, though somewhat obliquely, by a scabrous line, supposed to represent the keel of a vessel.—The second he termed the *os lunare*, from its supposed resemblance to a crescent. It has a concave articular surface on one side, and a convex articular surface on the opposite; and when held to the eye, with the horns of the crescent towards right and left, it appears to have somewhat the figure of the moon in

her first quarter.—The third bone in this row he termed *cuneiforme*, or wedgelike bone, from its being impacted between the *lunare*, and one of the bones of the distal row called the *os unciforme*. It is known from the other bones of the carpus by two articular surfaces meeting at less than a right angle, and by a third articular surface lying in a plane at right angles to the other two, but not coming into contact with either.—The last bone of this row is the *os pisiforme*, and so named from its being in general about the size of a pea. It has only one articular surface.

The first bone of the second or the distal row, commencing also from the radial aspect, he termed *trapezium*, though it will be difficult to discover a resemblance between its form and that of the figure to which it is compared. It has three articular surfaces; two of them meet at an obtuse angle; the third, which is not in contact with either, is concave and oblong, but protuberant in the middle between side and side.—The second bone of this row is the *os trapezoides*, a name also implying an analogy between its form and that of the trapezium, an analogy which certainly has been imagined, but surely cannot be easily seen. This bone has four converging articular surfaces, extending between two scabrous surfaces, which, if not parallel, are nearly so. Sue calls it the pyramidal bone, and it certainly is more like to an obtruncated pyramid than to a trapezium.—The third bone of this row is the *os magnum*, from being the largest bone of the carpus. It is easily distinguished from all the rest by having a rounded articular head, resembling the distal articular extremities of the metacarpals.—The fourth bone of this row is the *os unciforme*, so named from a hooklike process, which forms a well marked character of distinction.—In this account of the bones of the carpus, I have purposely declined making any reference to the engravings, as they do not represent the different characters to which I have alluded.

The whole of these bones are seen in connexion in the two figures representing the hand of the right side. The first a view from the anconal, and the second from the thenal aspect. In these figures the *trapezium* is marked T. m., the *trapezoides* T. s., and the *os magnum* O. m. The rest are distinguished by merely the initials of their names. The *os pisiforme*, which cannot be seen from the anconal aspect in fig. 1. is seen from the thenal in fig. 2. and is marked P. The manner in which each is articulated, will serve to explain how much they are calculated to diffuse any concentrated force.

The scaphoides is articulated with the radius, the trapezium, the trapezoides, the os magnum, and the os lunare.

The os lunare with the radius, the scaphoides, the os magnum, and the os cuneiforme.

The os cuneiforme with the os lunare, the os magnum, the os unciforme, and the os pisiforme.

The os pisiforme with the os cuneiforme.

The trapezium with the os scaphoides, the os trapezoides, and the metacarpal bones of the thumb and forefinger.

The trapezoides with the trapezium, the scaphoides, the os magnum, and the metacarpal bone of the fore finger.

The os magnum with the os scaphoides, the os lunare, the os trapezoides, the os cuneiforme, the os unciforme, and the metacarpal bone of the middle finger.

The os unciforme with the os magnum, the os cuneiforme, and the metacarpal bones of the ring finger and the little finger.

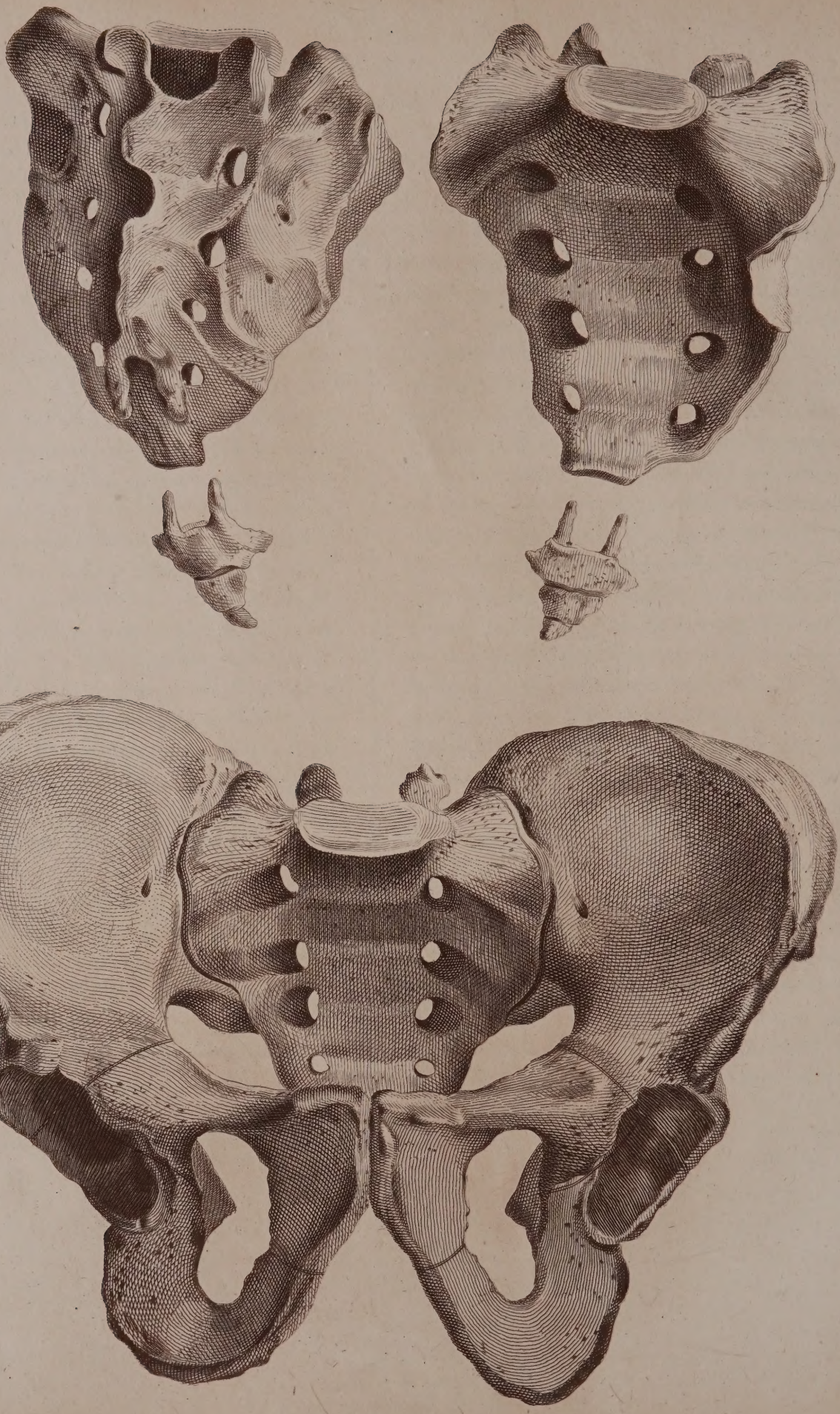
PLATE XX.—*Continued.*

BONES OF THE METACARPUS.

The long bones immediately distad of the carpus are termed the bones of the metacarpus, and are five in number. They are all concave on the thenal aspect, and proportionally convex on the anconal; are all thicker towards their extremities than towards the middle, where they often exhibit the impressions of muscles called *interossei;* are all much alike at their distal extremity, where they terminate in a round condyloid head, but differ considerably at their proximal extremity, where each is distinguished by its mode of articulation with the carpus. The metacarpal bone of the thumb by a concave articular surface A, extending from its radial to its ulnar aspect. The metacarpal bone of the fore finger by a deep angular notch B, extending from the anconal to the thenal aspect, for receiving the salient angle of the trapezoides. The metacarpal bone of the middle finger by an articular surface C, obliquely transverse to the axis of the bone. The metacarpal bone of the ring finger by an articular surface D, directly transverse, or nearly so. The metacarpal bone of the little finger by an articular surface E, rounded from the thenal aspect. These several characters best represented in figure first.

BONES OF THE FINGERS.

Immediately distad of the metacarpus are the bones of the fingers, and two remaining bones of the thumb. Viewing the bones of the fingers across from the radial to the ulnar aspect, they present three rows, which anatomists have chosen to denominate phalanxes, or as some would rather have it, phalanges, preferring the Greek plural to the English. The row next to the metacarpal bones is the proximal phalanx; the row beyond it the middle phalanx; and the last row, which terminates the fingers, the distal phalanx. The bones of all these phalanxes taper from their proximal to their distal extremities, and at their proximal extremities, though the bones belonging to the same phalanx be alike in form, and only differing slightly in magnitude, yet the bones of each are easily distinguished from those belonging to any other phalanx. At its proximal extremity F, each bone of the first or proximal phalanx exhibits a hollow orbicular surface, for receiving the round condyloid head of the corresponding metacarpal bone. The joint which is formed in this way being a ball and socket joint, admits of motion in different directions, as motion radiad, and motion ulnad, besides the motions of flexion and extension. The bones of the second or middle phalanx, at their proximal extremity G, present each an articular surface, which has two lateral depressions, and an eminence between them. The articulation which is thus formed admits only of flexion and extension. The bones of the last or the distal phalanx have a similar appearance at their proximal extremities, but are easily distinguished from any of the bones of the other two phalanxes, by having no articular surface at their distal extremities. A bone corresponding to those of the middle phalanx is wanting in the thumb.



E. Mitchell sculp.

PLATE XXI.—From Sue.

The figures in this plate are a repetition of those in Plate XV. They are seen in connexion with those of the trunk in Plates XI. and XII.; the views of the os sacrum and coccyx in connexion with those of the vertebral column in Plate XIII. From the sacrum being a part of the pelvis, and the two lateral bones of that cavity as much parts of the sacral extremities as the two scapulæ are of the atlantal, they again are introduced to preserve the ideas of general connexion, and to save the trouble of turning back to the previous figures. The lateral bones are, besides, marked here with double lines, to shew in connexion the several pieces of which each is composed, and which anatomists are accustomed to describe as separate bones, under the names, os ilium, os ischium, and os pubis.

PLATE XXII.—From Sue.

The two lateral bones of the pelvis have been termed by anatomists the *ossa innominata;* the present plate exhibits two views of the *os* innominatum of the right side, the first view from the external or peripheral aspect, and the second from the internal or central. An os innominatum, at the time of birth, and for some years after, continues in three separate pieces, united only by means of cartilage, at the places marked by the double lines. Of these three, the os ilium is the largest, and the only one articulated with the sacrum.

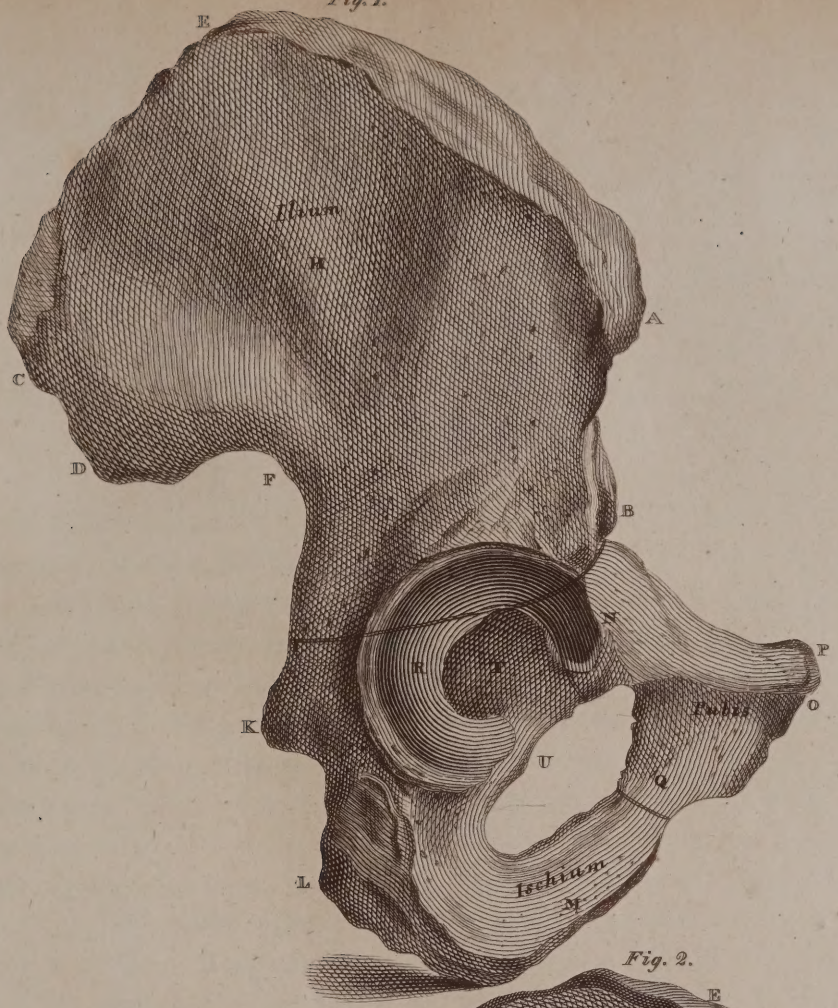
OS ILIUM.

The parts noticed in this bone are A, its anterior and superior spinous process, from which a ligament, called Poupart's ligament, extends across to the lateral parts of the symphysis pubis, forming what is commonly called an arch. Under this arch two muscles, the *psoas magnus* and *iliacus internus* pass to the femur. The crural artery and the crural nerve to be ramified on the thigh, and the crural vein, with several lymphatics conveying their fluids back to the heart. B, an anterior and inferior spinous process, affording an origin to one of the heads of a muscle, called the *rectus cruris*, a flexor of the hip joint, and extensor of the knee joint. C, a posterior and superior spinous process, and D, a posterior and inferior spinous process between which, as in a notch, were lodged the lateral parts of the sacrum. The part of the margin between A and E is usually termed the crest of the ilium, to which are attached, at one of their extremities, the *external oblique*, the *internal oblique*, and the *transverse muscles* of the abdomen. At F is seen a part of what is called the ischiadic notch, or the ilio-sacro-ischiadic notch, as not only the Ischium, but the Ilium and Sacrum regularly enter into its formation; this notch is a passage for a muscle towards the femur, named the *pyriform* or *external iliac;* a passage also for the great sciatic nerve, the gluteal artery, the ischiadic, and the pelvien pudic, and for accompanying veins and lymphatics. From the central aspect G, fig. 2. arises the *iliacus internus* muscle; this aspect is regularly concave, and, although the muscle be interposed, is in every part equably pressed by the viscera within. The peripheral aspect H, fig. 1. presents both eminences and depressions, an appearance which is partly owing to the actions of muscles. In some individuals advanced in life, this bone, like the scapula, is found to be remarkably thin towards the middle of the concavity, and in others to be in that place absorbed between the muscles of the opposite sides. I, fig. 2. shews the irregular surface where it was articulated with the os sacrum, and that union strengthened partly by ligament, and partly by cartilage.

OS ISCHIUM.

The parts noticed in the os ischium are its spinous process K, and what is usually termed its tuberosity L. From each of these processes one of the muscles, named *Gemelli*, extends to the larger trochanter of the femur, and to each is attached one of the ligaments, called the Sacro-sciatic or Sacro-ischiadic. Between these ligaments, the artery termed the pelvien pudic returns into the pelvis, and the tendon of the *obturator internus* passes out to the femur, surrounded in its course by the two *Gemelli*. The lower part of the tuberous process is the part on which we are supported while sitting; this process affords an attachment to several muscles, and, among others, to the long head of the *biceps cruris* to the *semitendinosus*, and the *semimembranosus*, which at once are extensors of the hip joint, and flexors of the knee joint. From M, which is termed the ramus of the Ischium, one of th-

Fig. 1.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R
T
Pubis
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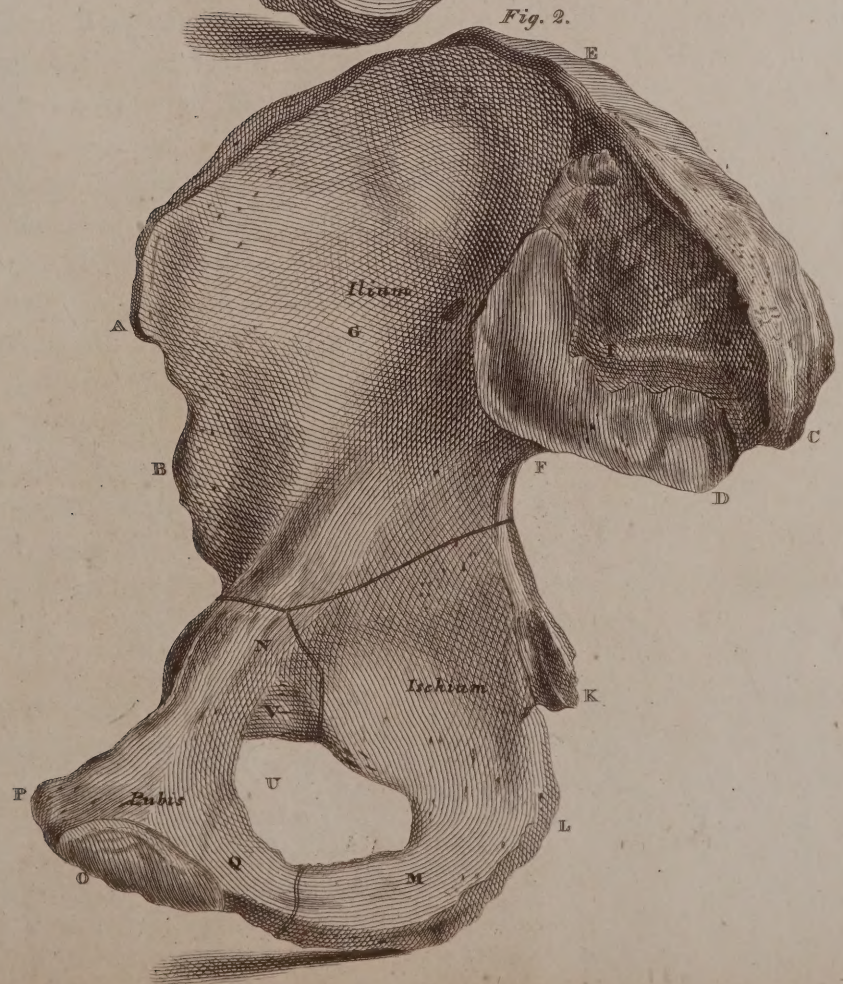
Fig. 2.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corpora cavernosa penis, and one of the muscles named *erectores penis* are known to take their origin; and a little beyond them, towards the adjoining ramus of the pubis, two of the heads of the muscle called the *triceps adductor femoris*.

OS PUBIS.

Pubis here is the genitive of pubes, and, therefore, os pubis, literally translated, is not the bone pubes, but the bone of a part which is called the pubes, and hence, this word, in the classical sense, implying somewhat more than the bone, anatomists, in speaking of the bone only, have been led to employ the genitive pubis instead of the nominative pubes. N shows the body of the pubis, where it forms a junction with the ilium and ischium at the acetabulum, or the cavity in which the head of the femur rolls. O, the tuberosity, where it forms a junction with its fellow of the opposite side through the medium of a ligamento-cartilagenous substance. This junction is what has been termed the symphysis pubis. To the part P, and to a spine which extends from it laterad towards the ilium forming a part of the boundary of the pelvis, is attached the tendon of the *rectus abdominis;* to the spine in particular, what has been termed the ligament of Gimbernat, a part of the thin tendon of the *internal oblique*, and also a part of what has been denominated the fascia of the *transversalis*. These several attachments diminish the aperture by which the crural vessels pass from the pelvis to the sacral extremity. The part Q is the ramus of the pubis, forming a junction with the ramus of the ischium, at the place marked by the double line.

THE ACETABULUM.

R, the acetabulum in which the head of the femur rolled, is better seen in the preceding Plate. It appears from the double lines that it is formed by the ilium, ischium, and pubis; the ischium forming the greatest part, and the pubis the least. It is deeper above than below, as the femur is more liable to be luxated upwards than downwards. At the lower part, towards the foramen U, there is a deficiency of bone, at which part, the blood-vessels enter to supply the organs that were lodged within the cavity. In the recent subject, the whole is deepened by a ligamento-cartilagenous brim, which protects the thin osseous margin; and which, extending across the notch, affords also protection to the blood-vessels that run under it. The whole of the bottom, excepting at T, the seat of an interarticular gland, is covered with cartilage. This gland assists the capsular ligament in supplying the joint with the necessary quantity of lubricating fluid: and from a ligament passing through it to the head of the femur, a ligament affected by every change of relative position between its opposite points of attachment, the excitement of the gland, and consequently its secretion, is in ordinary cases always proportioned to the quantity of motion. Yet the ligament, besides, performs another office in contributing to the security of the joint; when the femur is impelled upwards and outwards, this ligament changes its direction; and when the impulse is not too great, forces back the head into the acetabulum, producing the effect, not so much by its physical strength, as by a happy mechanical contrivance. This effect, as well as the contrivance by which it is produced, may be seen by removing the capsular ligament, by then dislodging the head of the femur, and afterwards pushing it upwards and outwards.

FORAMEN THYROIDEUM.

U, the foramen thyroideum, is formed entirely by the os ischium and os pubis. In the recent subject it is

occupied by a thin but dense aponeurotic membrane termed the *obturator ligament.* From the opposite sides of this ligament arise two muscles which are afterwards inserted into the femur—one named the *obturator internus*, and the other the *obturator externus.* At V, a sinuosity in the os pubis a small space is left for the passage of an artery called the *obturator artery*, and for the passage of a vein and nerve distinguished also by the epithet *obturator.* As the ligament, therefore, the two muscles, the artery, the vein, and the nerve considered as related to this foramen, are all distinguished from those of their species by the epithet *obturator*, would there be any great impropriety in calling the foramen the *foramen obturatorium* instead of the *foramen thyroideum?* The name *foramen ovale* is objectionable, as that name is already appropriated to a passage between the auricles of the heart.

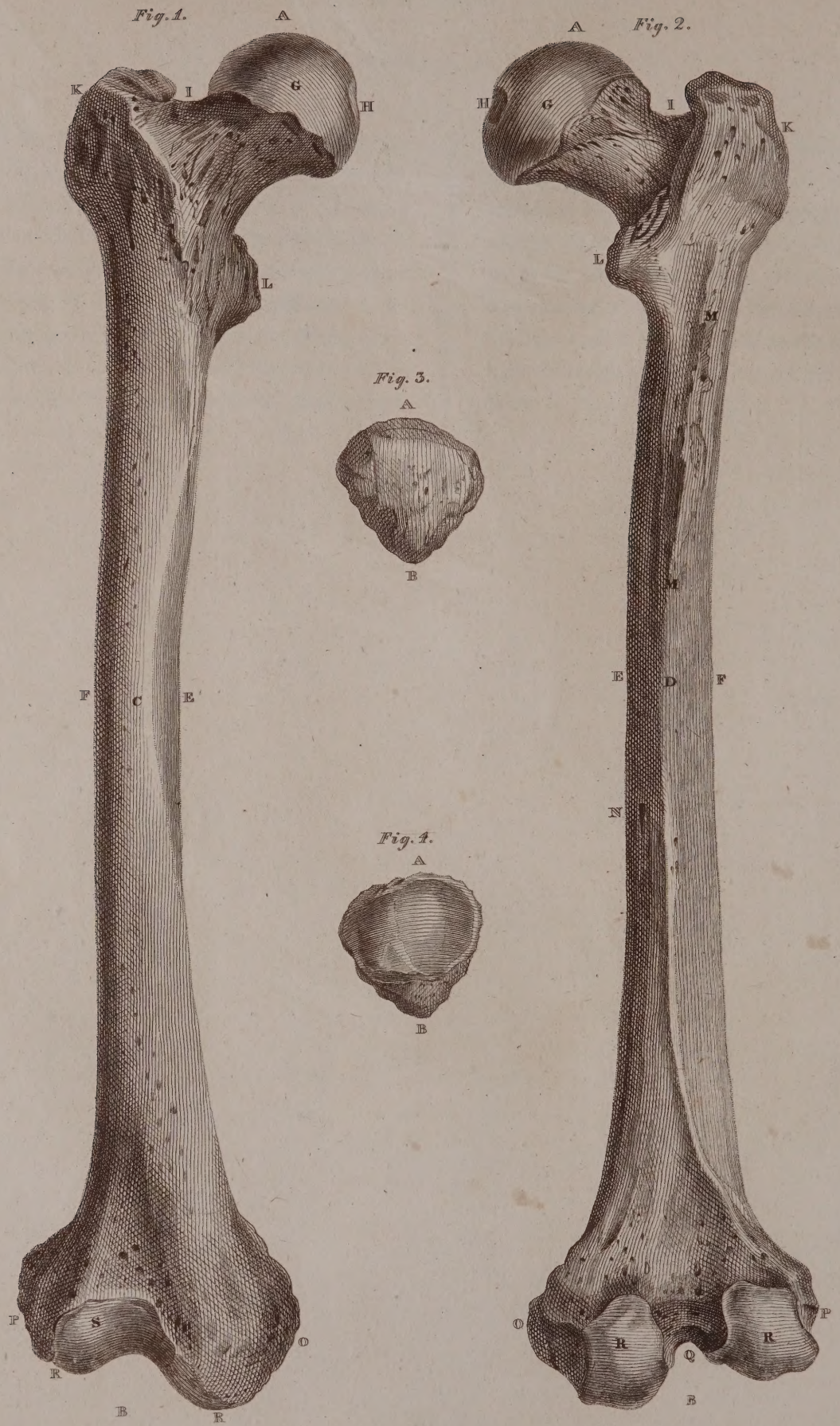
Fig. 1.
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Fig. 3.
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Fig. 4.
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Fig. 2.
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B

PLATE XXIII.—From Sue.

Fig. 1 and 2. Two views of the femur of the right side; the first from the rotular, the second from the popliteal aspect. A, the proximal extremity. B, the distal. C, the rotular aspect. D, the popliteal. E, the tibial; and F, the fibular. G, the head covered with cartilage, which had been lodged in the acetabulum. H, the depression where the ligament was attached that passed through the interarticular gland. I, the neck or cervix of the femur inclined at an obtuse angle to the axis of the bone. By this inclination the distance between the femora is increased (see Plate IV.), a larger space allowed for the muscles, a freer discharge for the fœcal and urinary evacuations, and an abrupt transition prevented from the size of the trunk to that of the thighs. K, the trochanter major, a tuberosity to which are attached several muscles that extend the hip-joint, abduct the femur, and roll it outwards. L, the trochanter minor, into which are inserted the *psoas magnus* and *iliacus internus*, two muscles which bend the hip-joint, adduct the femur, and roll it outwards. From these trochanters, a ridge termed the *linea aspera*, into which the muscles called adductors are inserted, may be seen, Fig. 2, at MM. this line ceases before it reaches the distal extremity, and terminates at the place where the superficial femoral artery, by following a course which is not the shortest, but evidently the safest, passes from the tibial to the popliteal aspect. Near this line, on its tibial side, may be seen at N the passage by which the medullary artery entered the bone. Beyond this point, the femur begins gradually to enlarge, until it terminates in two tuberosities, O, the larger, termed the internal or tibial condyle, and P, the smaller, named the external or fibular condyle. Q, a depression between the two condyles, Fig. 2, corresponds to an eminence rising from the tibia. RR, the parts of the condyles which came successively into contact with the tibia, are covered with cartilage in the recent state. The parts in view were brought into contact by a state of flexion; the parts which are rotulad, by a state of extension: the whole could not have been brought into contact with the articular surfaces of the tibia at the same time. In this joint, as in many others, the centre of motion, during flexion and extension, is constantly observed to be changing its position; in flexion here it advances poplitead, and during the time of extension rotulad; by this mechanism, the muscles employed in moving the bones are, during their action, constantly losing a part of their lever, while those which moderate or antagonise them are acquiring a proportional accession of lever. Another articular surface at S, Fig. 1, at no time comes into contact with the tibia; it is that which corresponds to the central aspect of the rotula or patella.

Fig. 3, A view of the rotula, from its peripheral aspect. Fig. 4, A view of the same from its central aspect. A, its proximal extremity; B, its distal. Four muscles—the *rectus cruris*, the *vastus externus*, the *vastus internus*, and the *crureus*, uniting their tendons to extend the leg, these become ossified, where they pass between the condyles, and from what is here called the rotula or patella. By this change of structure in their tendons, the muscles acquire the advantage of a pulley, an accession of lever, slide more easily upon the femur, and afford a better protection to the joint. In the same way the flexor tendons of the great toe become ossified when opposite to the joint between its metatarsal, and its proximal phalanx: in large animals, as the polar bear, not only the flexor of the great toe, but of all the toes, become ossified in similar circumstances; while in the horse, a large animal well known to walk upon tiptoe, the flexor tendons of the di-

gital phalanxes are ossified not only at the usual place, but ossified likewise at the last joint, constituting there what is commonly known by the name of shuttle-bone. These regular ossifications of tendons, when opposite to joints, are generally termed sesamoid bones, from the smallness of their size, although the pairs which belong to the several toes of the elephant be as large as many human patellæ. The remarks of Monro on these bones are excellent, and display at once the soundness of his judgment, the extent and the accuracy of his observations.* Be the name of these bones, therefore, what it may, it must be obvious, from their origin and use, that they and the rotulæ, if they are to be classed by the nature of their functions, decidedly belong to the same genus. The united tendon of the four muscles, after being ossified opposite to the knee-joint, is usually called the *ligament of the patella*, and passes onward to be inserted into the rotular aspect of the tibia, at a small distance from its proximal extremity.

* See the last page of his Anatomy of the Human Bones.

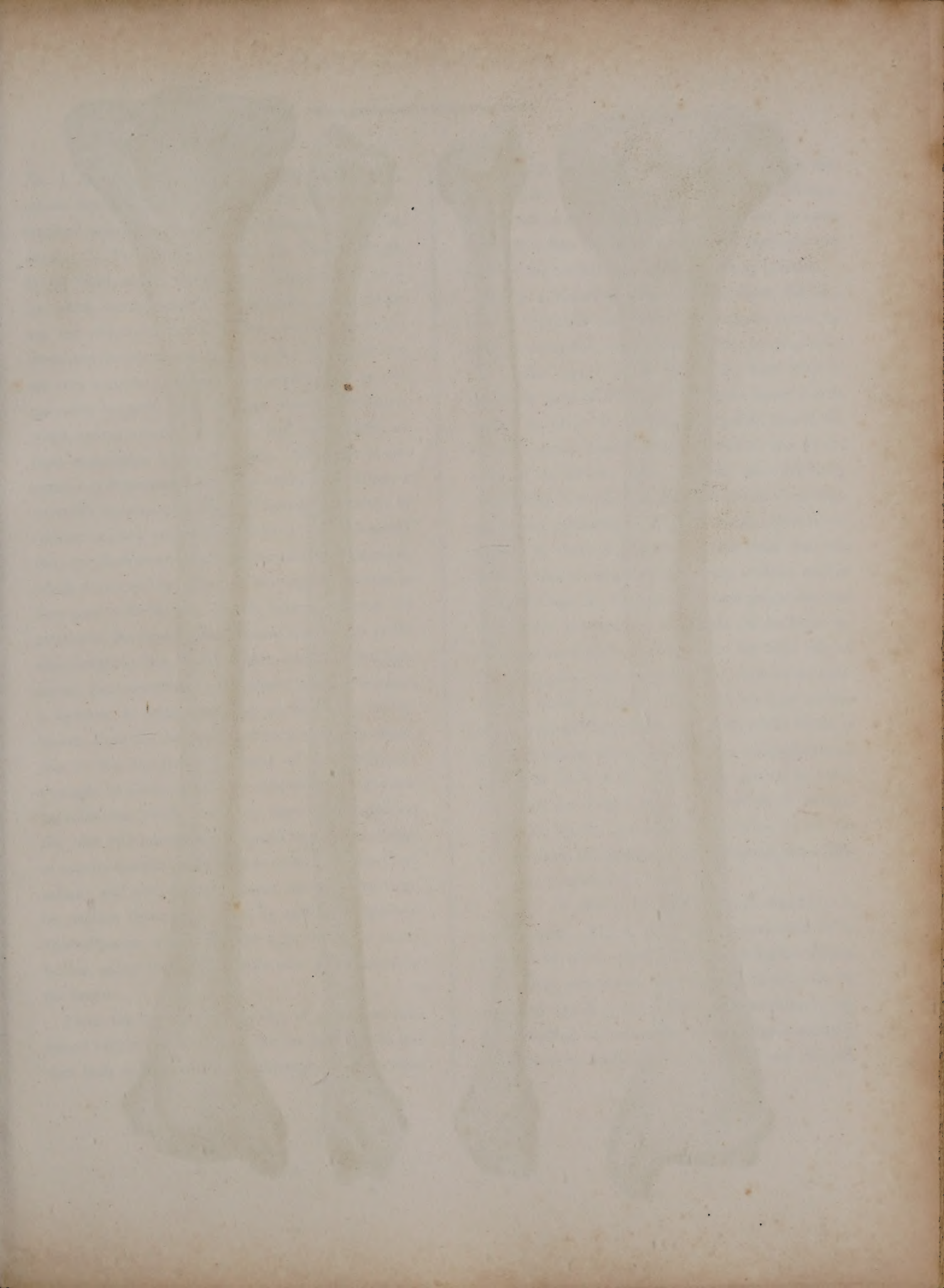
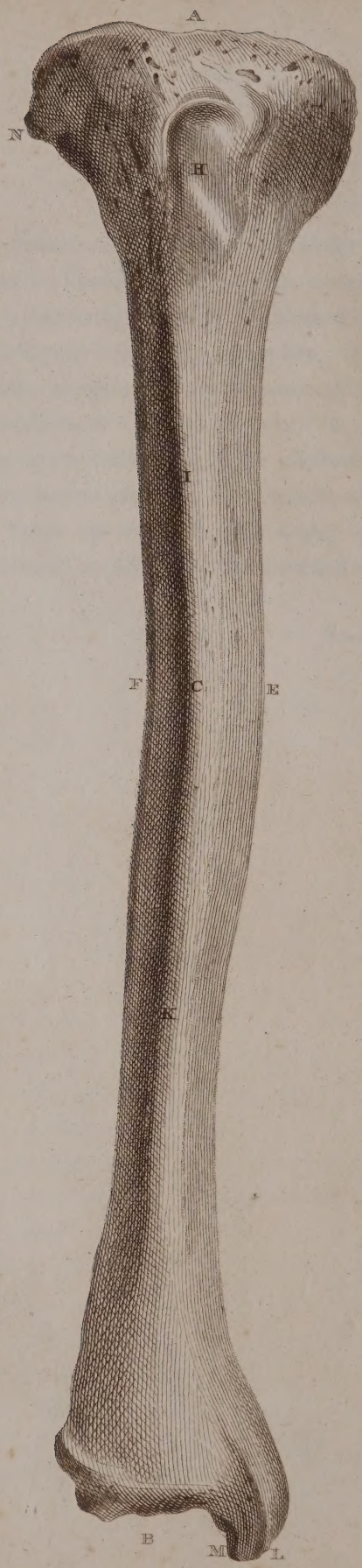
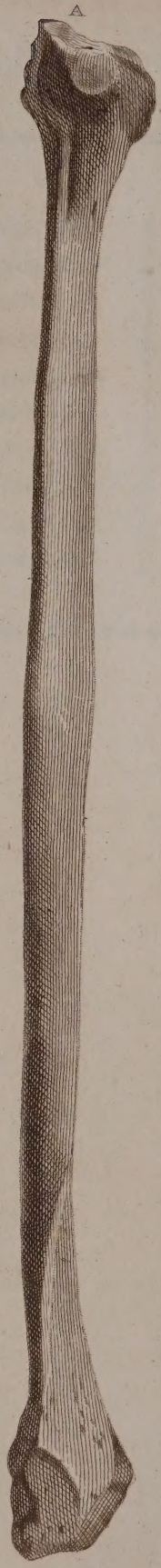


Fig. 1.





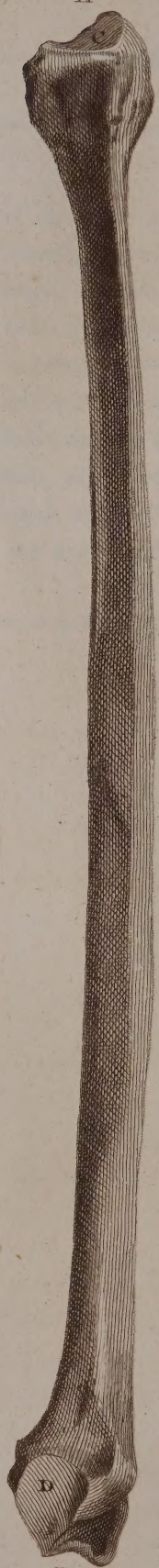


Fig. 2.

E. Mitchell sculp.

PLATE XXIV.—From Sue.

Fig. 1. A view of the tibia of the right leg from the rotular aspect. Fig. 2. A view of the same from the popliteal aspect. A, the proximal extremity. B, The distal. C, The rotular aspect. D, The popliteal. E, the tibial, and F, the fibular. The articular cavities which corresponded to the condyles of the femur are not observed, but the tuberosity rising between them may be partly seen at G, fig. 2. These cavities are very superficial, though deepened a little by two moveable interarticular cartilages, termed *semilunar*, which extend round their edges, and are attached, at their extremities, to the tuberosity. This sort of mechanism is frequently imitated in works of art, where a moveable substance is interposed between other two, to facilitate motion and diminish friction. To this tuberosity are likewise attached two interarticular ligaments, which are termed *crucial*, from crossing one another as they pass to the femur. These ligaments oppose the rotation of the femur outwards, and the rotation of the tibia inwards; but, besides these cartilages and ligaments, there are several other organs within this joint; a ligament is found extending across on the rotular aspect, from the one semilunar cartilage to the other, this is the *transverse ligament* of the cartilages; through its whole extent it is imbedded in a glandular substance, which assists the capsule in supplying the joint with lubucating fluid, and may, by its change of relative position, contribute to excite that gland into action: and yet that excitement must depend more on another ligament, termed by anatomists *ligamentum adiposum*, which, like the ligament in the acetabulum, passes through the substance of the gland to the femur.

From the quantity and variety of apparatus contained within this joint, there are few joints in the human body so liable to disease, although, from the little variety of its motions, and the singular mechanism displayed in the origin, course, and insertion of its ligaments and muscles, so admirably calculated to resist any motion but flexion and extension, there are few joints of the human structure less liable to luxation.

H, fig. 1. Shews the tuberosity into which the ligament of the patella was inserted; beyond this point, the bone is triangular, and two of its sides meeting upon the rotular aspect in the line I K, form what is called the spine of the tibia; this spine ceases a little beyond K, where the tendon of a muscle, named the *tibialis anticus*, passes obliquely across to one of the bones of the tarsus. Here the tibia, after gradually diminishing in its diameter from the proximal extremity, begins gradually to increase in size, till it terminates at B, where it presents a hollow transverse articular surface to meet a corresponding articular surface of the Astragalus. The point L, which projects beyond this surface, is termed by anatomists the *malleolus internus* or inner ancle, it descends on the tibial side of the Astragalus, and presents to that bone an articular surface, which is seen at M. The articular surface which received the proximal extremity of the fibula, is not represented, though the process which furnished it may be seen at N, fig. 1., the groove in which the fibula was lodged before it arrived at the astragalus, at O, fig. 2.; and at P, in the same figure, the groove which the medullary artery formed, immediately before it entered the bone.

Fig. 3. A view of the fibula from its outside, or fibular aspect. Fig. 4. A view of the same from its inner side or tibial aspect. On comparing the atlantal and sacral extremities, the Fibula is found to be the bone corresponding to the Ulna; and accordingly, upon extending our researches to comparative anatomy, we perceive it exhibiting the like variety and unsteadi-

ness of character, sometimes large, sometimes small, and sometimes merely a process of the tibia, sometimes forming a part of the knee joint, but not of the ancle joint, and sometimes, as in man, a part of the ancle joint, but not of the knee joint.

A, Its proximal extremity. B, Its distal. C, The articular surface, and nearly transverse, where it was connected with the process of the tibia at N, fig. 1. D, The articular surface, where it moved upon the side of the astragalus. Having passed beyond the groove in the tibia, it becomes flattened, and forms what is called the *malleolus externus* or outer ancle.

Fig. 1.

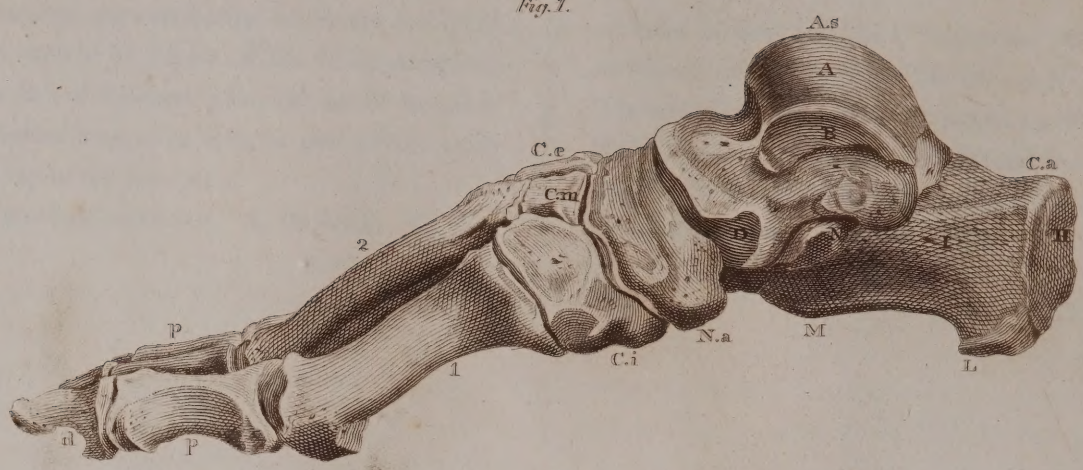


Fig. 2.

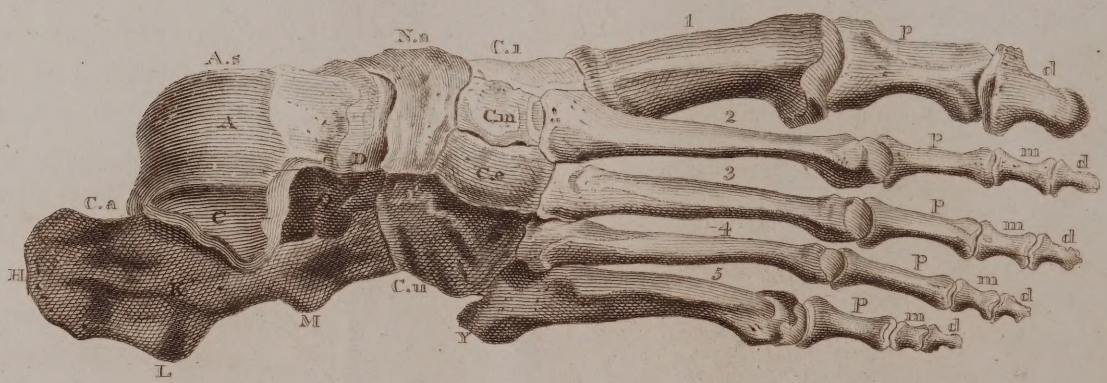
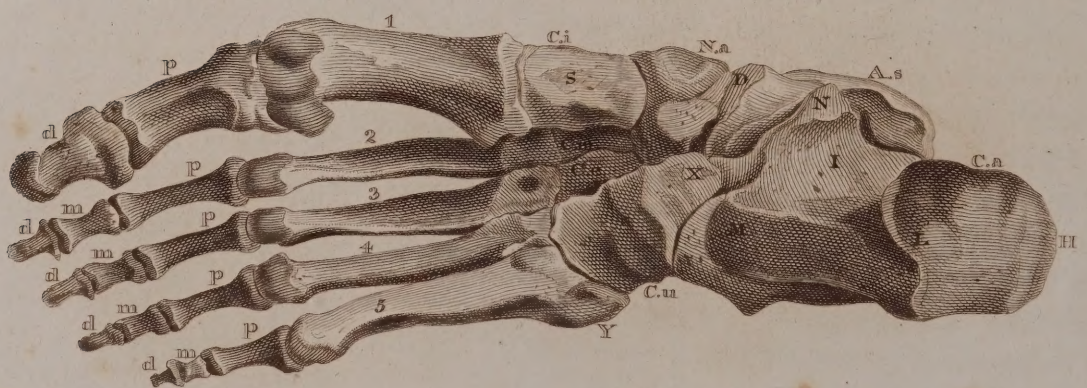


Fig. 3.



E. Mitchell sculpt.

PLATES XXV. AND XXVI.—From Sue.

Plate XXV contains figures of the bones of the foot when in connexion, and Plate XXVI. figures of the same when they are separated; that the two Plates may illustrate one another, the references are made in the following explanation to the different aspects under which the bones are presented in each. These bones, exclusive of those which are termed sesamoid, are twenty-six: seven tarsal, five metatarsal, and fourteen digital, or belonging to the toes.

The tarsal bones are the Astragalus, the Os calcis, or the Calcaneum, the Os naviculare, the Os cuboides, the Os cuneiforme internum, the Os cuneiforme medium, and the Os cuneiforme externum. In the several figures, As. denotes the Astragalus, Ca. the Calcaneum, Na. the Os naviculare, Cu. the Cuboides, Ci. the cuneiforme internum, C.m. the cuneiforme medium, and C.e. the cuneiforme externum. The five metatarsal bones, beginning with that of the great toe, are distinguished by the numerals, 1, 2, 3, 4, 5. The proximal phalanx of the toes by p. the middle phalanx by m. and the distal phalanx by d. Two pairs of figures in Plate XXVI. are left without either letters or numerals: the larger pair represents the sesamoids, which usually occur at the distal extremity of the first metatarsal; the smaller pair the two sesamoids which, in some individuals, are found at the distal extremity of the metacarpal bone of the thumb. An account of the use and origin of such bones has already been given, Plate XXIII. in the description of the rotula or patella.

Plate XXV. fig. 3. is a view of the foot from the internal or tibial aspect; it represents one of the appearances which anatomists denominate arches of the foot. The arch seen here extends from the proximal extremity of the Calcaneum to the distal extremities of the first three bones of the Metatarsus; the intermediate bones are the Astragalus and Os naviculare. This arch is seen from above in fig. 2, and from below in fig. 3.

Fig. 2. is a view of the foot from the fibular aspect, where another structure, denominated an arch, is observed to be formed by the Calcaneum, the Os cuboides, and the fourth and fifth of the metatarsals.

Fig. 3. is a view of the foot from the plantar aspect, where a transverse arch is observed to be formed by the Os cuboides, and the three cuneiforme bones; and another arch in the same direction by the five bones of the Metatarsus: these two may be seen from their convex aspect in fig. 2.; they are termed the transverse arches of the foot, the first two are the longitudinal. By means of these arches, the muscles, the nerves, the veins, the arteries, and the other soft parts situated on the plantar aspect of the foot, are sufficiently protected in ordinary cases against any pressure that might injure their structure, or impede their functions. In the living body, they are found to expand during pressure from above, and to recoil when that pressure is removed. By this elasticity, and their admirable structure, they combine in diffusing concentrated forces, and in causing each part to sustain a proportional share of their effects. The want of such arches, and their elasticity, is readily perceived, and severely felt by those persons whose feet are flattened on the plantar aspect, where the soft parts are exposed to a pressure which impedes their functions, and where there is no springiness of the foot to afford any aid in rising from the ground. The forms of these arches are principally owing to the shapes of the bones of which they are composed, and to the manner in which these are arranged, while the forms are preserved by ligaments and

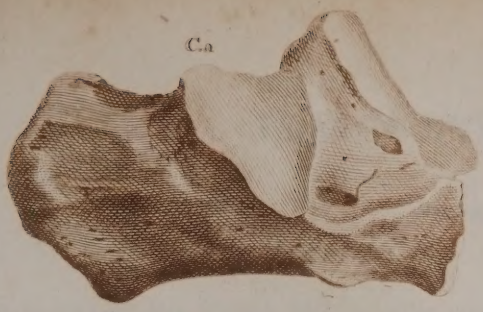
muscles, whose origin, insertion, course, and arrangement, display a mechanism that seems well calculated to excite admiration, but which, unless we indulged in digressions entirely out of place, admits of no explanation here.

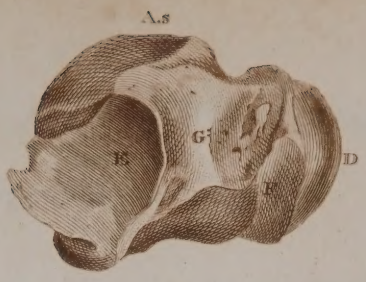
ASTRAGALUS.

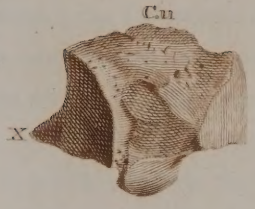
In treating of the bones of these arches separately, we naturally begin with the Astragalus, the one which, in the order of regular succession, is next to the leg, and the only one of the tarsal bones that is articulated with the tibia and fibula. Plate XXV. fig. 1, 2. A, The convex articular surface on which the end of the tibia moved, where the point of pressure between the two bones was necessarily varied by every change of relative position, and its effects suddenly diffused over a wider extent of surface. B, fig. 1. The lateral articular surface corresponding to that part of the tibia called the *malleolus internus*. C. fig. 2. Another lateral articular surface of greater extent, corresponding to that part of the fibula, named the *malleolus externus*. As these two lateral surfaces are not parallel, the foot, besides flexion and extension, is permitted to enjoy a considerable degree of lateral motion, tibiad and fibulad. A fourth articular surface D, partially seen, fig. 1, 2, and 3, is more fully displayed in the separate figure, Plate XXVI. where the figure of the Os naviculare, on the right, presents the cavity into which it was received. In this last plate, the Astragalus rests on its tibial aspect, and exhibits those articular surfaces by which it was connected with the Calcaneum. These surfaces are marked E. F. between which there is a deep fossa, marked G, for lodging an interarticular gland, and a strong ligament, which, passing through it to the Calcaneum, stimulated the gland and strengthened the connexion between the two bones.

CALCANEUM.

Plate XXV. fig. 1, 2, and 3. H, The part to which the *tendo Achillis* was attached, the common tendon of the two muscles which form the calf of the leg, and which have therefore been named *Gastrocnemii;* they are principally the muscles which extend the ancle joint, receiving but very little assistance from the *tibialis gracilis*, which, although it be inserted along with them, is too deficient in physical strength to produce much effect as an auxiliary, and also but very little assistance from the *tibialis posticus*, the *peroneus longus*, the *peroneus brevis*, the *flexor longus pollicis pedis*, or the *flexor longus digitorum pedis*, which, though muscles of great physical strength, yet, from passing near to the centre of motion, are by that means deprived of the necessary lever for extending this joint in opposition to any of the ordinary causes of resistance; hence it is, that when the *tendo Achillis* is ruptured, these muscles are found to produce scarcely any sensible effect in the way of extension. I, fig. 1. and 3. is a sinuosity on the tibial aspect, along which the nerves and the blood vessels pass in safety to the sole of the foot, where they are again sufficiently protected by the concavities of the four arches. K, fig. 2. A view of this bone from its fibular aspect, where it is convex. L, fig. 1, 2, and 3, a tuberosity on its plantar aspect, from which the *aponeurosis plantaris* and the *flexor brevis digitorum pedis* were observed to take their origin. M, another tuberosity on the same aspect, which afforded an origin to the plantar ligament, and to the *adductor pollicis pedis*. N, fig. 1. and 3. The astragalar process, upon one side, supporting the Astragalus, and, upon the other, forming a part of the sinuosity. At its distal extremity, the Calcaneum terminates by an articular transverse surface, where it was connected with the Os cuboides; this surface is not ex-

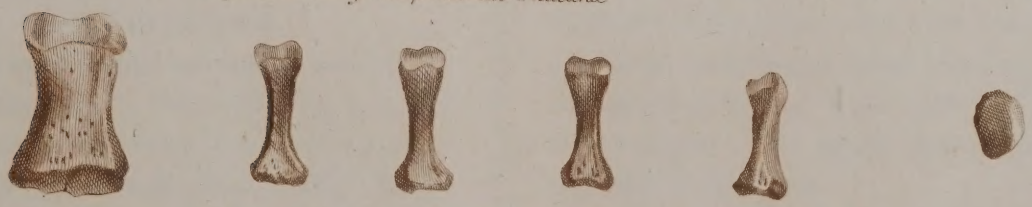






Bones of the Metatarsus

Digital Bones of the proximal Phalanx



Digital Bones of the middle Phalanx

Digital Bones of the distal Phalanx

hibited in any of the figures, but its edge may be seen, Plate XXV, fig. 2 and 3, and in the figure of the separate Calcaneum, Plate XXVI.: this last figure represents the Calcaneum from its fibular aspect, and from above, and was principally intended to show those articular surfaces by which it was connected with the Astragalus: these surfaces are marked OO, and PP is a deep scabrous depression between them, uniting with the fossa of the Astragalus, in affording a sufficient space to the gland, and to the ligament already mentioned. The extremities of both the depression and fossa, as forming parts of the same cavity, may be seen on the fibular aspect of the foot, at Q, fig. 2, Plate XXV. These articular surfaces do not extend horizontally distad, but exhibit a slight degree of inclination plantad or downwards. When any impulse, therefore, from above is communicated from the Tibia to the Astragalus, the Astragalus not only presses downwards upon the Calcaneum, but slides forwards, communicating a large portion of the impulse to the Os naviculare, which, from different points, transmits it to the three Cuneiform bones, which, in their turn, diffuse it through the first three of the Metatarsals.

OS NAVICULARE.

The Os naviculare is seen in connexion with the Astragalus, at the letter D, Plate XXV. fig. 1, 2, and 3; and that cavity into which it received the round head of the Astragalus at R, Plate XXVI. On the side opposite to this cavity, there is a convex articular surface presenting three facets, to meet the three Cuneiform bones. These facets are not represented in any of the figures; but some general idea may be formed of them by returning to fig. 1 and 2, Plate XXV, where this bone, and the three Cuneiform, may be seen in connexion.

OS CUNEIFORME INTERNUM

Is seen in connexion, Plate XXV, fig. 1, 2, and 3; and separately, at fig. 1, Plate XXVI. It is flattened between two surfaces; one of them concave, partly articular, and partly scabrous, where it points to the Os cuneiforme medium; the other convex, and entirely scabrous, where it points to the tibial aspect of the foot. Towards the convex aspect of the foot they gradually converge so as to form an acute angle; and towards the plantar aspect of the foot, they terminate in a rounded scabrous tuberosity, as at S, fig. 3, Plate XXV. At their other extremities they are bounded by two articular surfaces which are nearly parallel; the largest corresponding to one of the facets of the Os naviculare, and the smaller to the transverse articular surface of the first Metatarsal. In the separate figure, Plate XXVI, the concave surface is seen at T, the tuberosity at U, and the surface by which it was articulated with the first Metatarsal at V.

OS CUNEIFORME MEDIUM,

Seen in connexion, Plate XXV, fig. 1, 2, and 3. It has two broad articular surfaces which converge to an angle on the plantar aspect, and two triangular articular surfaces nearly at right angles to these. Towards the rotular aspect, these four surfaces enclose a scabrous quadrangular space, whose opposite sides are nearly parallel, and whose angles approach nearly to right angles. The separate figure, Plate XXVI, represents it imperfectly.

OS CUNEIFORME EXTERNUM,

Seen in connexion, Plate XXV, fig. 1, 2, and 3. It presents the same general characters, nearly as the Os Cuneiform medium, but only the rough quadrangular space on its rotular aspect is much longer in proportion to its breadth, while the lines which terminate

its longer sides are less straight; the one pointing to the neighbouring Cuneiform, being somewhat concave; and that pointing to the Os cuboides, angularly convex.

OS CUBOIDES,

Seen in connexion, Plate XXV, fig. 2 and 3, and also separately in Plate XXVI, where it is seen from the fibular aspect, and from above, and where it exhibits the process X, that filled up the space between the Calcaneum and the Os naviculare, Plate XXV, fig. 3. Of all the six sides ascribed to this bone, no two of them are equal or parallel. It is somewhat flattened between the two that appear on its rotular and plantar aspect, while that on the last, or the plantar aspect, is very easily distinguished from the other by a transverse ridge. Of the other four sides, the longest and thickest, partly articular, and partly scabrous, is that which points to the Cuneiform bones, while the opposite side, the shortest and thinnest, is entirely scabrous, pointing to the fibular aspect of the foot. The remaining two sides, opposite also to one another, are wholly articular—the larger adapted to the distal extremity of the Calcaneum—and the smaller of the two to the proximal extremities of the fourth and the fifth of the Metatarsals. By these characters may the different aspects not only be known, but the Os cuboides of the right foot readily distinguished from that of the left.

BONES OF THE METATARSUS,

Seen in connexion, Plate XXV, fig. 1, 2, and 3; and also separately in Plate XXVI. Between their proximal and distal extremities they are all concave on their plantar aspect, Plate XXV, fig. 1 and 3, and all, except the first, proportionally convex on their rotular aspect, fig. 1 and 2. What is denominated their transverse arch, is best seen near their proximal extremities, where the second, third, and fourth, exhibit each two lateral articular surfaces, that converge from the rotular to the plantar aspect, like the converging sides of a wedge, and thus contribute to constitute the arch. See fig. 2, where they appear on the rotular aspect, and fig. 3, where again they appear on the plantar aspect. The first and the fifth, from occupying the sides of the foot, have only one lateral articular surface, by which they are easily distinguished from the rest, and from the position of these surfaces cannot well be mistaken for the 1st and the 5th of the other foot; for, suppose them articulated with the other foot, their lateral articular surfaces must be turned from the rest, or their concave sides made to point upwards. The remaining three, though not so well marked, yet distinctly show what had been their tibial and fibular aspects, by their two sides, between which they are somewhat flattened, always converging, fibulad and plantad, towards a kind of a rounded angle that lies between their fibular and concave aspects: these characters, conjoined with others which are obvious at a glance, distinguish them from the analagous Metatarsals of the other foot. To distinguish those of the same foot, it is to be observed, that the first is triangular, having one of its angles directed rotulad, and the other two laterad, forming the sides of its plantar aspect; that the breadth of the second, from its proximal extremity on the convex aspect, gradually diminishes between its lateral articular surfaces; that the breadth of the third, on the same aspect, and between its lateral articular surfaces, is either increased or continues the same; that the fourth being articulated on its tibial aspect, not only with its fellow, but with the Os cuneiform externum, has longitudinally a greater

extent of articular surface upon one side than upon the other; and that the fifth is easily distinguished by its single lateral articular surface; and by Y, a tuberosity with a scabrous surface projecting proximad, and exhibiting a large articular surface, obliquely transverse, by which it was connected with the Os cuboides.

The five, as viewed from their plantar aspect, are presented separately in Plate XXVI.; compared with those of the Metacarpus, all, except the first, are more slender in proportion to their length, and also exhibit at their distal extremities a somewhat greater proportional extent of articular surface. At the distal extremity likewise of the first may be seen in their place the ossified parts of the flexor tendons, which are termed its sesamoid bones. The several bones of the digital phalanxes, compared with those of the atlantal extremity, are not only more slender, but proportionally shorter. As to their forms, and their several modes of articulation, they are similar, and therefore require no separate explanation.

PLATE XXVII.—From Sue.

Bones internally are generally of a loose cellular structure, exhibiting cells formed either by osseous spicula, or thin laminæ crossing one another at different distances. In the bones of the Cranium, such a structure is termed *Diploe;* in other bones where the spicula, or laminæ, are slender and yielding, intersecting one another at small distances, and in various directions, they form what is called the *spongy structure;* or, when more rigid and at greater distances, the *reticulated* or *cancellated* structure of bones. All these cells, whether large or small, are lined with a membrane, which has been termed the *internal periosteum;* they can be seen only by sections of the different bones in which they are contained.

Fig. 1. represents a section of the basilar maxilla, or lower jaw, passing through several sockets of the teeth, and along the inferior maxillary canal, the regular course of the artery and nerve that supplied them with nourishment and vital energy. Fig. 2. and 3. are two transverse sections of the femur. Fig. 4. a section of the rotula or patella. Fig. 5. a section of the Astragalus. Fig. 6. a section of the Calcaneum. Fig. 7. a section of four of the lumbar vertebræ; and fig. 8. a section of the Os sacrum and Coccyx. In the last two figures at AAA, is also seen a section of the vertebral canal, in which the spinal marrow, or that part of it called the *cauda equina,* was contained; and at BB, fig. 7. a section of those intervertebral spaces, where a substance intermediate in point of consistence, between pulp and cartilage, is, towards the edges, surrounded by the intervertebral ligaments.

Fig.1.

Fig.2.

Fig.3.

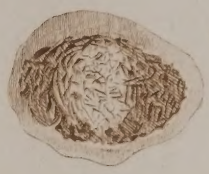


Fig.4.

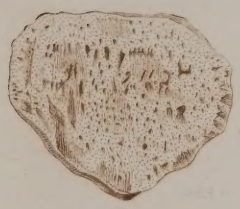


Fig.5.

Fig.6.

Fig.7.

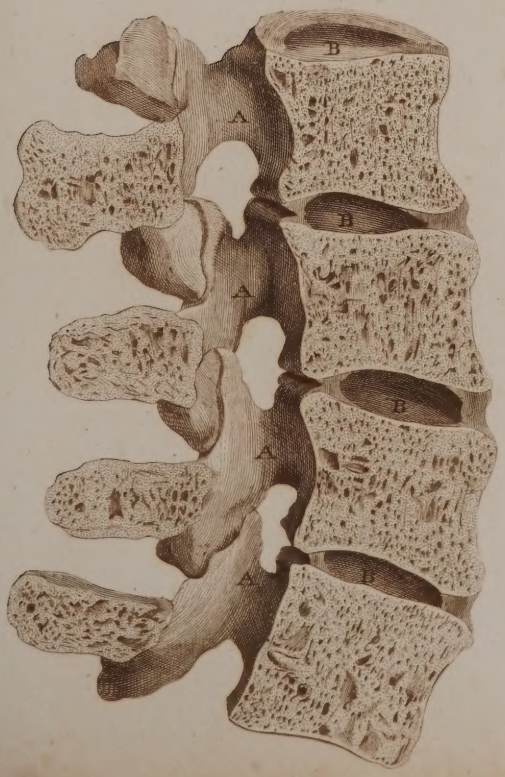


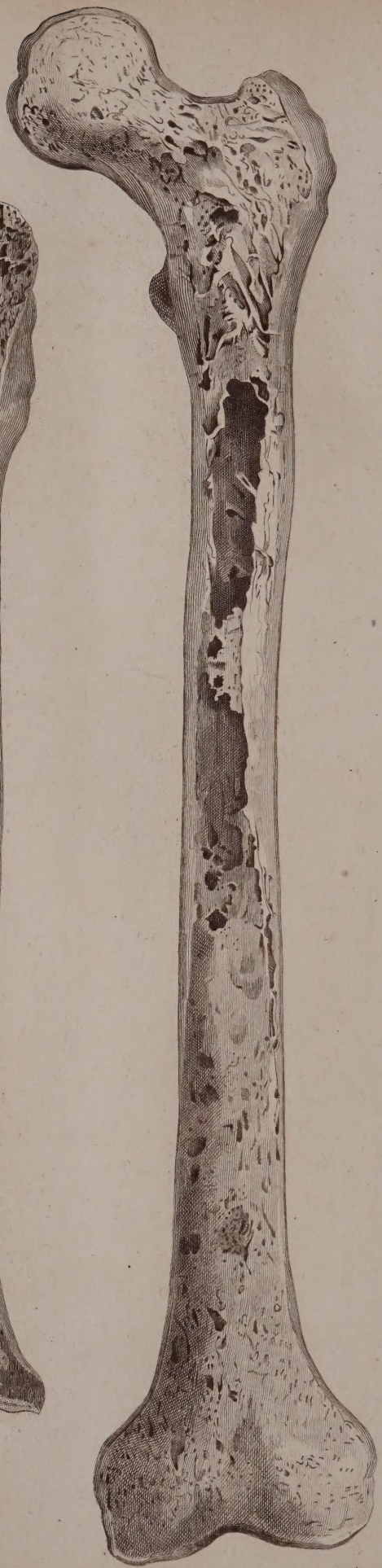
Fig.8.

E. Mitchell sculp.t

Fig. 1.

Fig. 3.

Fig. 2.



E. Mitchell, Soulp.t

PLATE XXVIII.—From Sue.

Fig. 1. and 2. Two longitudinal sections of the Femur. Fig. 3. A longitudinal section of the Tibia. The spongy structure is towards the extremities, where the compact peripheral substance is thinnest, and the cancellated structure towards the middle, where the compact peripheral substance is thickest. In this last structure the size of the cells is found to be larger in old bones than in young ones of the same dimensions; from which it appears, that after maturity, the intersecting laminæ and spicula, in certain parts of the round bones, begin to be obliterated by the increased action of their absorbents, or diminished action of their nourishing vessels, and that by this change a space is left in the form of a tube, to be filled with the substance commonly known by the name Marrow. This substance, agreeably to the usual acceptation of the terms, is seldom found to make its appearance till the bones have arrived at their ultimate dimensions, when the spongy structure begins also to contain more of medullary fluid or oily matter, than during any period of growth; and hence it is that anatomists so often experience the difficulty of separating the greasy matter from the bones of aged adults. This enlargement of cells in the round bones, without a proportionate degree of enlargement in their other dimensions, is not however peculiar to them. The large cavities in the bones of the cranium, known by the terms Antres or Sinuses, are indications of the age of the bone, more than of its size. These cavities communicate with the nostrils, and, instead of marrow, are filled with a thin vaporous fluid, which seems to be the case with all cavities in the osseous structure, that communicate directly or indirectly with any of the channels or organs of breathing, whether in round bones or in flat. Hence it is that the cavities of the Humeri and Femora of birds, accustomed to remain long upon the wing, from communicating with the lungs through the medium of air cells, are, in the adults, regularly filled with air instead of marrow, while feathers, deprived of such communications, seem to be furnished, like the swimming bladders of certain fishes, with particular organs for secreting air. In short, throughout the animal structure, wherever bulk, agility, and lightness are at once required, we regularly observe an increase of bulk, without a proportional increase of weight, and a strength depending more upon form, quality, and mechanism, than upon the quantity of the materials.

PLATE XXIX.—From Sue.

This figure represents the form, the several proportions, and the progress which ossification has made in the fœtal skeleton at the usual time of birth. The head proportionally larger than in the adult, but the bones of the Face, compared in size with those of Cranium, proportionally smaller. The depth of the lower jaw, and elevation of the thorax towards the chin, proportionally less, and the distance between them, on that account, proportionally greater. The cavity of the thorax proportionally smaller. The atlantal extremities, compared with the sacral, proportionally longer. The pelvis proportionally much less, the Ilium, Ischium, and Pubis united, at this time only, by cartilage. The Sutures of the cranium not yet formed. The extremities of the cylindrical bones, as the Humerus and Femur, the Tibia, Fibula, Radius, and Ulna, and the margins of the flat bones, excepting those which belong to the Cranium, entirely cartilaginous.

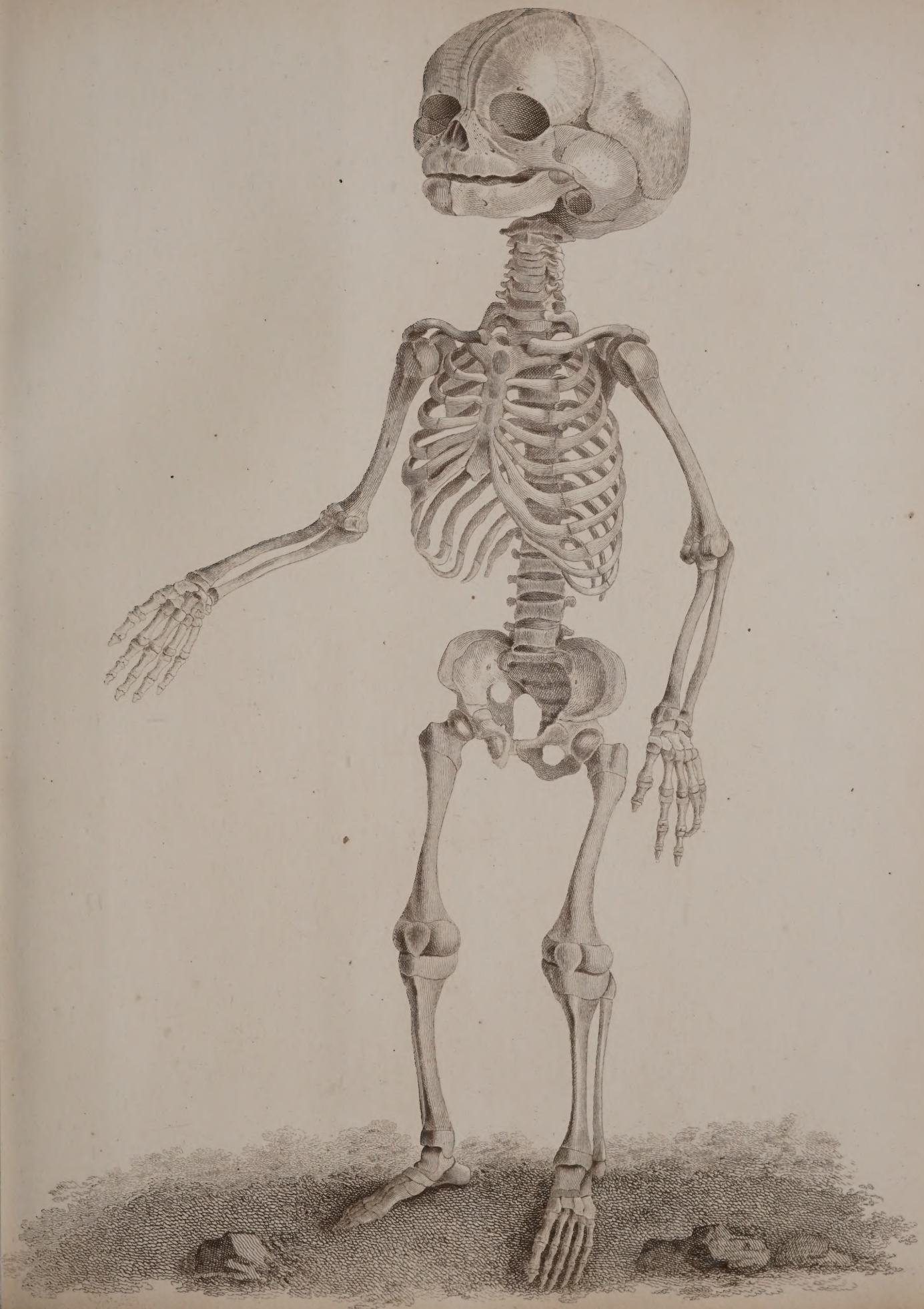


Fig. 1.

Fig. 2.

Fig. 3.

E. Mitchell sculpt.

PLATE XXX.—From Sue.

Fig. 1. The form and size of a fœtal skeleton of the sixth month; fig. 2. The form and size of one of the third month; fig. 3. The form and size of one at or about the tenth week. Fig. 1. At the sixth month, and for some time even after birth, the spinous processes of the several vertebræ are cartilaginous, and the cartilage here being removed, the whole Canal of the vertebral column appears open on the dorsal aspect; it is hence that during this state of the parts, when water is accumulated in the vertebral tube, from not meeting with sufficient resistance, it forms a tumour on the dorsal aspect, and constitutes the disease called the *spina bifida*. Besides, at this period, as the bodies of the vertebræ are united to the parts forming their processes only by cartilage, the right and the left halves of the tube are, in this disease, generally separated to a greater distance by the pressure of the water, a pressure which, when the body is erect, must always be greatest towards the sacral extremity of the column, the place where the tumour most frequently appears.

PLATE XXXI.—From Sue.

All the solids of plants and animals being formed out of fluids, the first state of the visible parts of every living organized structure which has yet been discovered, is that of a liquid secreted from certain vessels of the parent. In this liquid, an invisible agent, residing within, or acting from without, commences the processes of organization; proceeds to arrange the seemingly homogeneous particles; to produce a variety of different forms, colours, consistencies; and to construct a complicated system, similar to that which secretes the materials, materials which certainly are no more the causes of the form and mechanism, than the stones, bricks, and mortars of a building, are the authors of the plan or constructors of the architect by whom they are arranged. Accordingly, when the first materials are withheld by the separation of the offspring from the parent, the agent, notwithstanding, continues the processes of organization without interruption, completes the structure out of materials furnished by various species of food, prescribes not only the kind and the quantity, but the time when, and the manner how, it is to be received; or, if its structure be one that is sensitive, and formed for locomotion, employs it in frequently moving about, and in searching for what materials may be requisite. In considering these singular phenomena, if we proceed upon the hypothesis, that they are the effects of subordinate agents residing in the structures, and that a difference in the effects implies a corresponding difference in the cause; we must also suppose, with many of the ancients, that such invisible organizing substances belong not to any of the four elements, but to a separate and a fifth class of substances, totally distinct from any that are known in the science of chemistry, and that their genera and species are as numerous as the genera and species of the animal and vegetable structures which they form; in short, that there is in every living body, whether plant or animal, a *quintum genus*, or a *quinta essentia*, distinct from those elements of which the visible structure is composed. But, upon a subject that may lead to controversy, we must not enter farther at present, our business here being rather to describe the manner in which the bones are formed, than to investigate the cause or causes of their organization. So far then as the senses enable us to form an opinion, each bone, or, speaking more accurately, each species of bone, has its own specific mode of formation, some commencing from a single point to be gradually extended; some again, from a number of points, to be first extended, and afterwards united; some exhibiting their number of points at the same time; some in a regular order of succession. All begin in the form of a cartilage nearly transparent, and of little consistence; this consistence gradually increases, when, sooner or later, an osseous matter is observed to be deposited; in some cases, as the cartilage is formed and acquires a certain degree of consistence; in others, again, not so immediately, but after a considerable time has elapsed. In the bones of the cranium, in certain parts of the vertebræ and ribs, and of the flat and the round bones of the atlantal and sacral extremities, the ossification seems rapidly to follow the formation of the cartilage. A human skeleton in my collection not fully an inch and a half in length, and the figure of one which is much smaller, depicted in the works of the celebrated Kerkringius, are proofs that the formation of the cartilage in these bones, and these parts of bones, could not long have preceded the deposition of the osseous matter. As this deposition is, however, modified by various circumstances, we can hardly suppose that the progress or extent of ossification will be

Fig. 9.

Fig. 1.

Fig. 2.

Fig. 10.

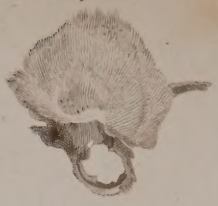


Fig. 3.

Fig. 5.

Fig. 4.

Fig. 13.

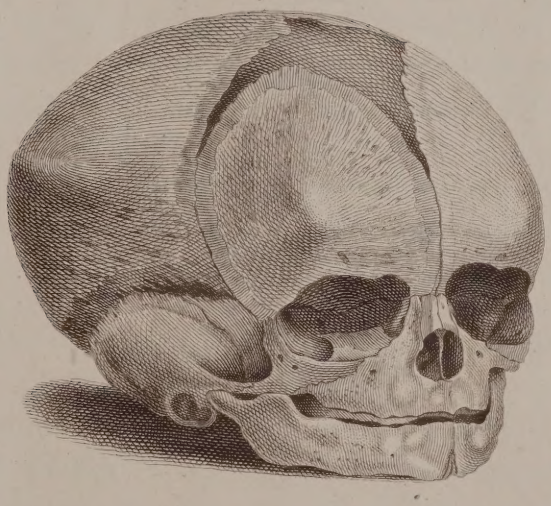
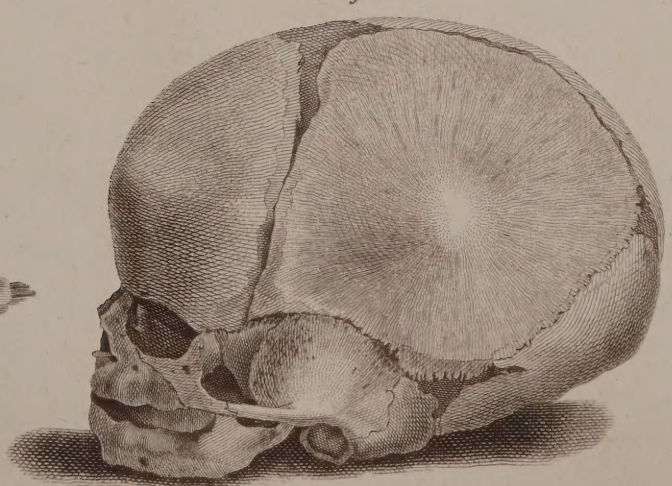


Fig. 15.

6 7

8

Fig. 14.



11

12

E. Mitchell sculp.t

PLATE XXXI.—*Continued.*

the same in all children of the same age. It is well known, that, at the time of birth, some are weak, sickly, and small, while others are comparatively vigorous, healthy, and large. In the bones, therefore, as well as in other parts of the system, we may naturally expect, at this period, to see the growth and the organization in very different stages of their progress. The whole bones of the healthy fœtus of the ninth month are admirably represented in the work of Albinus, entitled, *Icones Ossium Fœtus Humani*, while a few are depicted with equal accuracy in the following plate, which is copied from Sue. At this early period the frontal bone is always divided at the mesial plane into similar halves towards right and left, leaving unoccupied a large portion of that space which is termed the *bregma*, and over which it is afterwards extended, fig. 1, 2, and 13. The parietal bones are seen as if formed of osseous spicula, radiating all from a common centre, fig. 3, 4, and 14.—The occipital bone is in four pieces, united at the time only by cartilage; these pieces are the two lateral parts of the foramen magnum, fig. 6. and 7.; the cuneiform process, fig. 8.; and the largest portion partially subdivided into four parts, fig. 5. which filled up the space between the two parietal bones, the temporal bones and foramen magnum.—The temporal bone is then in three pieces, the squamous portion, the rudiments of the meatus auditorius externus in the form of a ring, and lastly, the petrous portion, fig. 11. and 12. which are seen here from different aspects.—The small bones of the Tympanum, at this period, are in general completely ossified, and even proportionally large in size,* while the basilara maxilla, or the lower jaw, is divided into two similar halves, at the mesial plane, or at what is termed the symphysis menti, fig. 13. In fig. 15. it is seen with some of the rudiments of the teeth beginning as it were to emerge from their sockets.

Sue has not deemed it necessary to give any more figures of the separated bones of the fœtal skeleton, although every bone, at the period of birth, presents an appearance considerably different from that which it afterwards assumes in the adult. The sphenoidal bone is then in five pieces, which are, the two temporal processes, the two halves of the transverse orbitary process, and the body of the bone, which also, at a somewhat earlier period, is divided into two similar halves at the mesial plane.—The ethmoidal bone is in two pieces, the crista galli, and that portion which forms a part of the nasal septum, being then cartilaginous. None of the vertebræ are found in fewer than three pieces, which are the body and the two lateral halves of their processes. The extremities and processes of the long bones, as the Humerus, Femur, Tibia, Fibula, Radius, and Ulna, are not only cartilaginous, but when they are ossified, are ossified separately, and, in some individuals, continue for years as distinct bones, connected, with their principals only, by cartilage, and known in anatomy by the term *Epiphyses*. A similar process of ossification is observable likewise in the metacarpal bones, in the metatarsal, in the digital phalanxes, and the marginal parts of the two scapulæ, and the two lateral bones of the pelvis; on the other hand, the two clavicles and the two halves of the basilar maxilla begin each from a single point of ossification, which extends gradually, and without interruption, till the whole is completed; these bones, like the bones of the Tympanum, are ossified early. The small bones which fill up the spaces which the cranial bones

* Ante maturitatem fœtus jam tota ossea hæc ossicula sunt, mireque perfecta, præcoci et magnitudine, et forma, et soliditate.—*Albinus. Icones Oss. Fœt. Human.*

in some individuals leave unoccupied, are not reckoned in the number of epiphyses; they in general continue distinct through life. They are named ossa triquetra, from their occasional shapes, ossa Wormiana, from Olaus Wormius, who was thought by some to be their discoverer, and supernumerary bones by the French. These bones are not ossified at birth, and even the bones of the Carpus and Tarsus have made very little progress at that period.

Fig. 1.

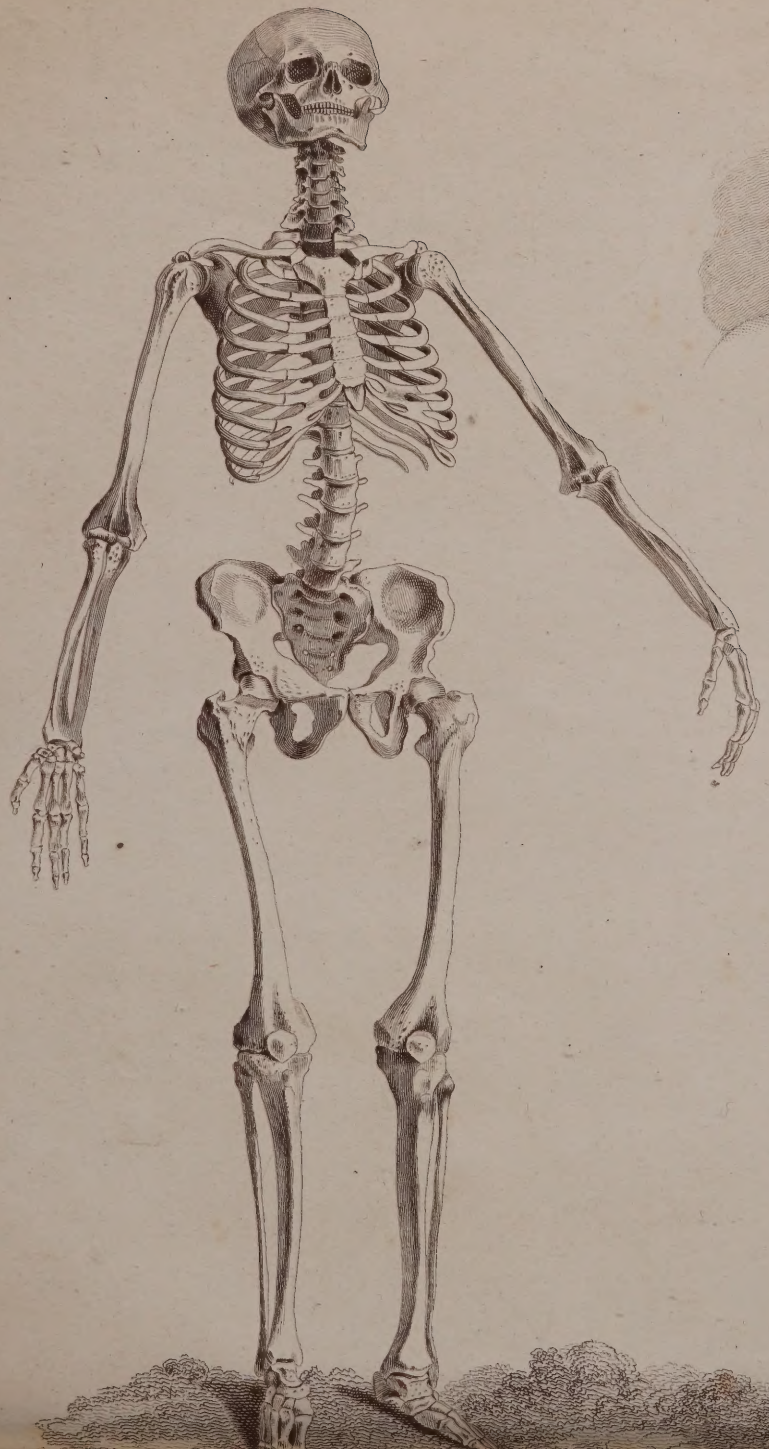


Fig. 3.

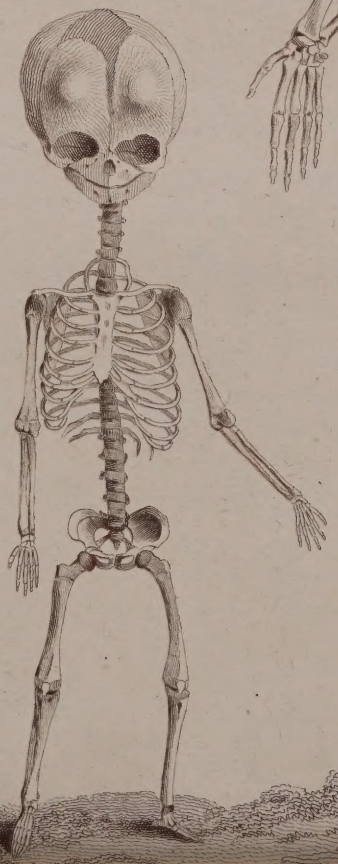


Fig. 2

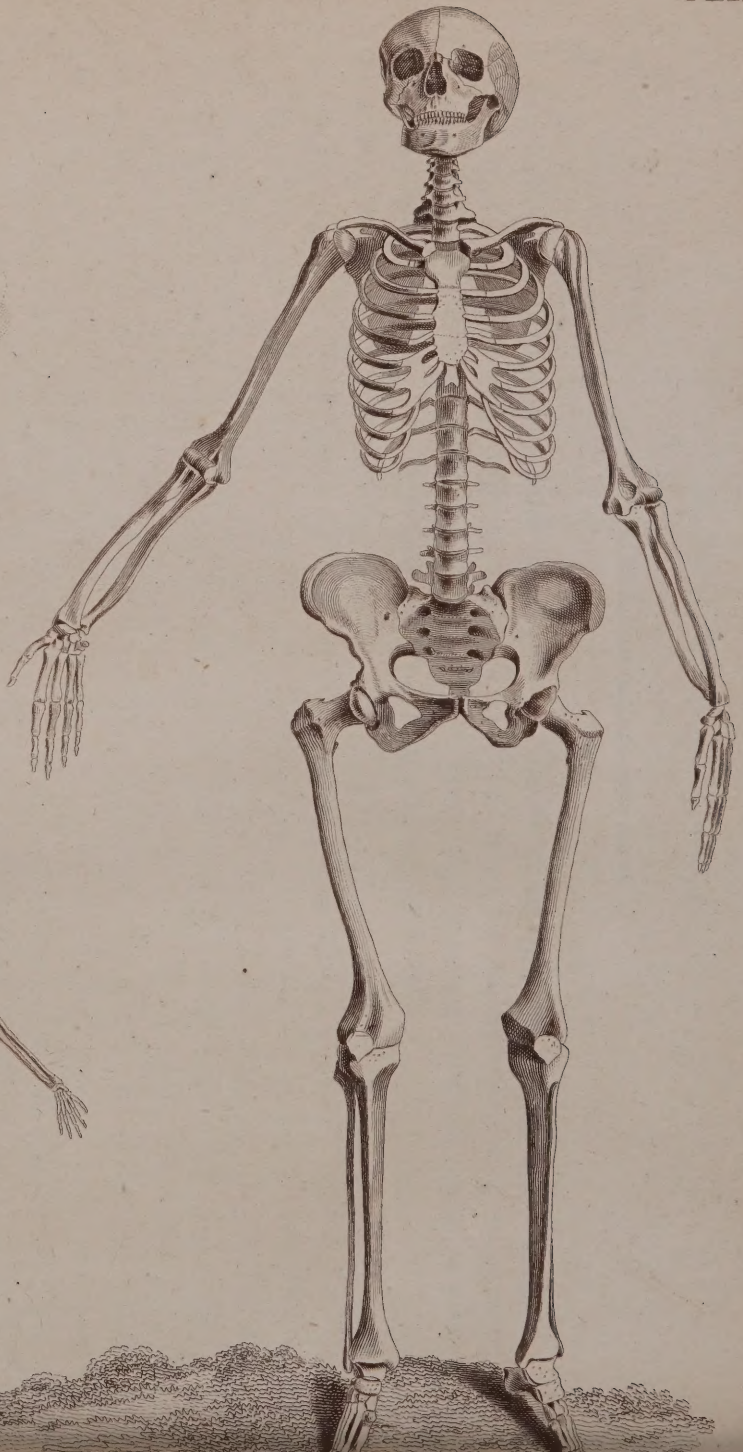


PLATE XXXII.—From Sue.

Fig. 1. Is a view of the male skeleton; fig. 2. of the female skeleton; and fig. 3. of the size and form of a fœtal skeleton about the fourth month. The three are accurately copied from Sue, the second being only a repetition of that which has appeared in Plate IV. At my suggestion they have here been engraved on the same Plate, and represented in very nearly similar attitudes for the sake of comparison; these attitudes are also copied from Sue, for as to those which Soemmerring has given to his female skeleton, although they be more graceful and elegant, and suggested by men eminent in modelling, sculpture, and painting, they contribute nothing to the comparison which is here intended.* Besides, he has only drawn a comparison between the male and the female skeleton, while the third figure is here introduced to shew that many of those characters which he has described as peculiar to the female, are more obviously discernible in the fœtal skeleton. For instance, he observes, that the scull of the female is proportionally larger than that of the male, a character, surely, which is more discernible in the fœtal skeleton than in that of the female. He adds, that the frontal sinuses of the female are proportionally smaller, and that her glabella is less elevated; the observation, I believe, is correct, but it should be remembered, that the elevation of the glabella depends on the size of the frontal sinuses, and that it is less elevated in the fœtus, where there are no frontal sinuses, than in the adult or grown up female, where they are small.

Sue has represented the frontal bone of his fœtal skeleton as divided into two similar halves. This appearance occasionally occurs in adult males, though not so frequently, Monro has remarked, as in adult females; at any rate, it is a regular and uniform appearance in the fœtal skeleton. The foramina of the scull, continues Soemmerring, are, notwithstanding the size of the bones, proportionally smaller in the female skeleton than they are in the male, as, for instance, the two foramina optica. I am somewhat doubtful whether this remark be founded on widely extended observation, or only on a few particular cases; the size of foramina is not only proportioned to the size of the organs, which they have to transmit, but, at the same time, to the range of motion to which these are exposed. The following observations admit of less doubt, that the bones of the face, in the female skeleton, are smaller and smoother, the orifices of the nostrils less expanded, the forms of the jaws more elliptic, and the cavity of the mouth narrower and shorter. Yet if these be true with regard to the female, they are equally true with regard to the fœtus, where all the appearances to which they allude are more obviously striking. The size of the face depends much on the size of the jaws, now the jaws of the fœtus are formed only to hold twenty teeth, while those of a grown or adult female are elongated so as to hold thirty-two. The smoothness of the bones is affected chiefly by the actions of muscles, but impressions by muscles are less perceptible on the bones of the fœtus than in those of the female. The elliptic appearance, in the form of the jaws, arises from the circumstance of their being less elongated backwards, and that elongation is proportionally less in the fœtal skeleton than it is in the female. As for the nostrils being less expanded, and the cavity of the mouth narrower and shorter, these are consequences of the smaller bones of which they are composed, and which also are proportionally smaller in the fœtus than they are in the grown or adult female. The remark, that the intervertebral cartilages are of a greater proportional depth in the female skeleton than they are in the male, may be true

* Samuel Thomas Soemmerring. Tabula, Sceleti Feminini, juncta descriptione *Trajecti ad Mœnum apud Varrentrapp et Wenner*, 1787.

of the skeleton which he has depicted, which, he says, was that of a young female. The depth of these, to a certain extent, depends upon age, and upon the degree and continuance of the pressure to which they have been previously exposed. It is always greatest, cæteris paribus, in early life when the fluids are abundant, and in old age, when these become scanty, it is so much diminished that the spine is bent forward; it is also diminished in consequence of pressure, and therefore the body, which has been erect during the day, is shorter in the evening than it was in the morning, after lying for several hours in a posture where the pressure was removed. Be the depth, therefore, the effect of growth, or the want of pressure, these causes operate more powerfully in the fœtal skeleton than in the grown or adult female, and the facts will be found to support the conclusion.

That the thorax of the female skeleton, in general, is proportionally less than that of the male, cannot be questioned. The thorax is expanded by habitually frequent and vigorous inspirations, and these occasioned by habitually frequent and vigorous exertions, to which the female is not in general so much accustomed, and the fœtus still less in proportion, having no occasion for any respiration while it lies *in utero*, and but little occasion for vigorous respiration for several months even after birth. The thorax, therefore, of the fœtal skeleton is not only proportionally smaller than that of the female, but is sometimes scarcely the size of the head. Soemmerring adds, that the sternum of the female is proportionally shorter than that of the male; that her ribs lie in planes of inclination, which are somewhat different; that they form more acute angles with their sternal cartilages; that the shoulders slope more; and that there is a greater proportional distance between her last ribs and the crest of the Ilium. But all these appearances naturally result from the smallness of the thorax, and from the unfrequency of full inspirations; they are therefore more observable in the fœtal skeleton than in that of the female. As to his remark, that the cartilaginous parts of the ribs, compared with the ossified, are proportionally more extensive in the female than they are in the male; it may be observed, that, considering proportions, the same parts are still more extensive in the fœtal skeleton, where the ossification is only in its progress.

If the clavicles of the female be less curved, and her atlantal extremities proportionally smaller than those of the male, it should be recollected that the curves of the clavicles are somewhat increased by the more vigorous actions of the muscles, and, consequently, are proportionally less in the fœtus than they are in the female; that the smallness of her atlantal extremities keeps them more in proportion to the size of the thorax, and, besides that, their size must depend, in some measure, upon the nature of the employment to which they are habituated. It is well known that not only the strength, but the bulk of a hand, accustomed to frequent and hard labour, are considerably different from what they would have been, had the owner led an easy sedentary life.

That the feet of the female are proportionally smaller than those of the male, is an observation that, with few exceptions, is confirmed by experience. Yet this is not a character peculiar to the female, as not only the feet, but even the whole sacral extremities are proportionally smaller in the fœtal skeleton than they are in the female. During the time that the fœtus is *in utero*, the head, from its greater specific gravity, is the part most dependent in the liquor amnii; hence the impulse of the heart, which sends the blood to it, and

the two atlantal extremities is partly increased by the force of gravitation. On the contrary, after birth, when the body is erect, the same force operates against the impulse to the head, co-operating with that which sends the blood to the sacral extremities. The effects of such a gravitating force are frequently perceived in the œdematous swellings of the legs, counteracting the return of the venous blood and lymphatic fluids during the day, when the legs are perpendicular, or nearly perpendicular to the horizon, but permitting their return, during the night, on assuming the horizontal position, so that the swellings are generally found diminished towards morning, and increased towards evening. Nay, it is not improbable, that this gravitating force, by acting in favour of the sacral extremities, in consequence of the change which takes place at birth, may be partly the cause why these grow in length and in thickness proportionally faster than the two atlantal, and ultimately arrive at a larger size.

In his Appendix to his Treatise on the Bones, Monro has mentioned several characters of the female skeleton, which he supposes to result as much from a difference of habits, as a difference of sex; but, be the cause, or causes, what they may, that produce these changes, it certainly appears, that the female skeleton, in all the parts hitherto compared, does, in form and structure, deviate less than that of the male from those characters which were originally common to both. It is in the pelvis, and pelvis alone, that we perceive the strongly-marked and peculiar characters of the female skeleton. It is there that we cease to trace the analogies between its proportions and those of the fœtus; or, in other words, it is there that, in deviating from those characters which at one time were common to both, we regularly find it deviating farther than that of male—the pelvis of the fœtus being always proportionally the smallest of the three, and that of the female proportionally the largest. In attempting to account for these marked distinctions, the anatomist seldom pursues his inquiries into the nature of the primary cause, which plans the structure, and directs the processes of its organization. Confining his researches to objects of sense, he is generally satisfied with describing phenomena in the order of succession in which they appear, and supposes his explanation complete when he ascertains the visible means employed by the primary and invisible cause. In tracing these means, he observes the dependant posture of the head in the liquor amnii; sees the blood ascending in the arteries towards the pelvis, in opposition to the force of gravitation, and the same accelerated by the same force, as it descends in its return through the veins and lymphatics; he sees likewise the greatest portion of that blood which, after birth, flows towards the pelvis, diverted at this period into the two umbilical arteries, and the viscera of the abdomen pressing atlantad towards the diaphragm, instead of sacrad, toward the pelvis. From these appearances he is led irresistibly to the conclusion—that the cavity of the pelvis, in these circumstances, cannot have the same means of expansion that it has afterwards, when the umbilical arteries are closed, and when, in consequence of this change of structure, and the change of position, the blood is impelled to it with greater force and in greater quantity, and, at the same time, the abdominal viscera made to descend with a pressure from above, and a pressure outwards in every direction. At birth, therefore, the pelvis of the fœtus must always be proportionally small, though at this period, and for some time after, very little difference is to be observed between male and female in this part

of their osseous structure. This difference becomes only striking when they are approaching to the age of puberty. It is then that the female begins to exhibit a new phenomenon peculiar to her sex. It is then that in her, the blood begins to flow in a greater proportional quantity towards the pelvis than in the male; nay, in such a quantity as to exceed the demands of nourishment, and to require that the superabundance be regularly evacuated by a monthly discharge, a superabundance which, during her pregnancy, is reserved as necessary for the nourishment of her offspring. By this determination of her circulating fluids, the Os sacrum becomes broader and less bent forwards; her Ossa Ilia are expanded outwards; the angle under the symphysis pubis is enlarged; and the distance between the tuberosities of the Ischia considerably increased, while the Os coccyx and sacral extremities, from this diversion of blood to the pelvis, increase not so fast, nor arrive at the same proportional size as in the skeleton of the male adult.

After these remarks on the forms and structures of the human skeleton, which relate to the differences of age and sex, I have only to add, that certain forms of the face and head, different from any that are known to occur in the male, the female, or the fœtal skeleton, are, as Camper has shewn, regularly observed in those sculptured figures which the ancients formed to represent their imaginary deities. In the singular design of these uncommon artificial forms, it evidently appears, that the artists had something more in their view than the mere difference of what Camper has denominated the facial angle. The part called the Face has many resemblances to that of the fœtus, and therefore is found proportionally small compared with the part which is named the Cranium. The two jaws seem also to be formed like those of the fœtus, as if destined to hold only twenty teeth instead of thirty-two, but at the same time with such a depth and quantity of bone as are only to be found in the full vigour and meridian of life; the forehead, too, as well as the jaws, presents a combination equally uncommon; a fœtal form of the frontal bone, with two sinuses and a glabella proportionally elevated; a combination that leads to a feature which, to the eye of the anatomist, is strikingly peculiar; a nose raised from the small receding bones of the face to the same elevation as the glabella; a nose of such size, prominence, and strength, as irresistibly to suggest an idea very different from what we are apt to form in looking at the small, the slightly prominent, and the feeble nose continued from the flat glabella of the fœtus. By methods such as these, the effects certainly of much previous observation and reflection, the ancient sculptors, by artificial, yet harmonious combinations of those characters which indicate youth, with those which express the vigour of manhood, and the dignity of age, and by carefully excluding whatever implied debility in the one, or decay in the other, have produced forms which, though not natural, are admirably calculated to dazzle the eye, to captivate the fancy, and engage the feelings, before the judgment, which is tardy in its processes, has time to operate. Besides, these forms were not intended to be those merely of ordinary men; for, though meant to be human, they were also meant to be something more—the representations of heroes or of gods, of whom men were supposed to be resemblances; though resemblances as unlike as an ape is to a man.

PLATES

OF THE

ARTERIES OF THE HUMAN BODY;

AFTER

Frederic Tiedemann,

PROFESSOR OF ANATOMY AND PHYSIOLOGY IN THE UNIVERSITY OF HEIDELBERG.

ENGRAVED BY E. MITCHELL,

UNDER THE SUPERINTENDENCY OF

THOMAS WHARTON JONES, SURGEON.

THE

EXPLANATORY REFERENCES

TRANSLATED FROM THE ORIGINAL LATIN, WITH ADDITIONAL NOTES,

BY DR. KNOX,

LECTURER ON ANATOMY.

SECOND EDITION.

EDINBURGH:

PRINTED FOR MACLACHLAN & STEWART, EDINBURGH.

1831.

EDINBURGH: PRINTED BY A. BALFOUR & CO., NIDDRY STREET.

TO THE PUPILS ATTENDING MY LECTURES.

GENTLEMEN,

EVER since I had the honour of delivering Lectures on Anatomy, I have, as you, perhaps, are already aware, uniformly taught, that a vague and general acquaintance with Anatomy, (characterised by an indifference for minute research, a misapprehension of the exact relative position of the various organs of the body, and a premature grasping at practical results, which can only flow from a wide and extended inquiry into human structure,) was a kind of knowledge serviceable to no one.

On the other hand, I think I have also insisted on this, that whether your views were directed towards Surgery, Medicine, Physiology or general Philosophy, your researches into Anatomy ought to be minute and precise. Now, conformably to these principles and views, which have been approved of by you and by all who seriously reflect on what ought to be the nature of a medical education, I ventured to introduce last winter into the dissecting room, Engravings copied from the celebrated works of SCARPA, SŒMMERING, WALTHER, and others, in order to encourage the Student of Anatomy to aim at higher views in his dissections, and to adopt as his model of research, the minute and accurate dissections of SCARPA, rather than the meagre and but too often incorrect descriptions of the Dissecting-room Manual. The experiment (for it was one) was eminently successful; and it was easy to observe, that, by the use of such delineations and descriptions in the Practical Rooms, the general character of the dissections shortly became altogether different: thus, many attempted and succeeded in obtaining such an acquaintance with the anatomy and physiology of the Nervous System as is rarely met with in the mere Student of Anatomy. Now, whatever I have said with regard to the Engravings of the Nerves is *mutatis mutandis* strictly applicable to the Work which I now beg respectfully to dedicate to you. It cannot, I imagine, be necessary for me, or any one, to

recommend these Engravings of the Arteries, (intended to be laid on the dissecting-table as a guide for your dissections,) farther than merely to observe that they are exactly copied from the celebrated Work on the Arteries by Professor TIEDEMANN of Heidelberg, than whom no more accurate anatomist lives. I may therefore be permitted, Gentlemen, to hope that these Engravings, executed with the utmost care by a distinguished artist, and constantly superintended during their execution by my friend and former assistant, Mr. T. WHARTON JONES, who, being at once the anatomist and artist, has left nothing for me to criticise, will prove eminently useful to you, and in no respect diminish the extent of actual dissection. Previous experience has made me confident they will not; for, if the anatomy of the Nerves be a matter of deep and general interest, the anatomy of the Arteries has claims on your attention, on the score of utility, which throw into the shade, comparatively, all other kinds of professional acquirements.

I have the honour to be,

GENTLEMEN,

Your most obedient and faithful Servant,

ROBERT KNOX.

AUTHOR'S PREFACE.

ALTHOUGH there have been many anatomists who, from their acquaintance with the arteries of the human body, have most diligently described them, and very materially aided in enlarging and extending our knowledge of their distribution, yet it cannot be denied that the anatomical student, without the assistance of Plates, however zealously he may gather his information from various works, and however carefully he may endeavour to retain his knowledge thus obtained, will, unaided, make but little progress. I indeed allow that anatomical knowledge can, with far more advantage, and with much more prospect of its proving useful, be obtained by actual dissection than by the examination of plates: But this demands a daily and a careful investigation of many bodies, and a considerable share of manual dexterity; besides, bodies cannot be obtained always, and everywhere, with equal ease. In short, whoever he may be, he cannot prosecute those dissections provided with that share of anatomical information which the manuals of anatomical students require of those engaging in such pursuits. For this reason we owe a debt of deep gratitude to those great men who have handed down, for the use and advantage of the student, engravings of their investigations.

But there are few anatomists who have given us their plates either plainly executed, true to nature, or with accurate references. For the most, whether conscious of the paucity of their own ability, or panic-struck at the necessary load of labour, have either borrowed the plates of others, which they have transferred, rudely executed and inaccurately delineated, to their own works, or given us their own dissections so negligently engraved, and contrary to the order of nature, that they exhibit the figures of parts removed from their natural situation, and disagreeing much in proportion and arrangement. And no one will deny, that to the student of anatomy more loss than advantage will accrue from his investigation of plates imperfect in themselves and inaccurately represented.

Of the Plates of the Arteries already existing, those only are worthy of praise, or indeed anyways remarkable, which HALLER, CAMPER, SCARPA and SŒMMERING have given to the world,—men widely celebrated, and deserving much from the student of anatomy. But it is to be regretted, that HALLER has taken the greater part of his plates from the bodies of children; that PETER CAMPER, in the Anatomico-Pathological Demonstrations, has only represented the arteries of the arm and pelvis; that the very elegant plates which the celebrated SCARPA has exhibited in his immortal work on Aneurism, merely represent the vessels of the arm and leg; and that the illustrious SŒMMERING has confined his beautifully engraved plates to the arteries of the organs of the senses. Since, therefore, there is still a work much required in which all the arteries of the human body will be given delineated of their natural size, in their natural situation, and according to their regular distribution, I have ventured to produce these my Plates of the Arteries, with their explanations, equally adapted to the anatomist, surgeon, and student of medicine.

That I might, if possible, render my knowledge of the arteries fuller and more accurate than any one's, I have laboured with indefatigable zeal for sixteen years in investigating their origin and distribution; I have with my own hands dissected upwards of five hundred bodies, and examined with no small degree of diligence subjects of both sexes, and of all ages. How much time and labour this task necessarily required, those alone who have witnessed and properly considered of this work can be adequate judges. Indeed, I by no means would have engaged in an undertaking so arduous, and linked with so many difficulties, had I not been cheered by the advantage that would from thence accrue to medical science.

In preparing these plates I have endeavoured to follow as guides, and imitate in their vigour, ALBINUS, HALLER, CAMPER, SCARPA, and SŒMMERING, who have merited so highly of anatomy. The plates represent the situation, connexion, and distribution of the arteries, that they may point out to the surgeon the high advantage resulting from a knowledge of the vessels of our body in the cure and healing of wounds, and that, from a comparison between the parts affected with disease or wounded, with these plates, he may more clearly understand how a flow of blood is to be dealt with, and where the vessels are to be compressed or tied. In performing operations, an examination of these plates, showing you parts with their accompanying arteries, layer after layer, is only requisite to enable you to avoid wounding the larger vessels.

In the explanations, I have always indicated the age and sex of the individual from whom the plate is taken, as the diameter of the arteries differ much according to the age and sex; but their relations, curvatures, and direction are so constant, that it is of no moment whether the body has been male or female, young or old.

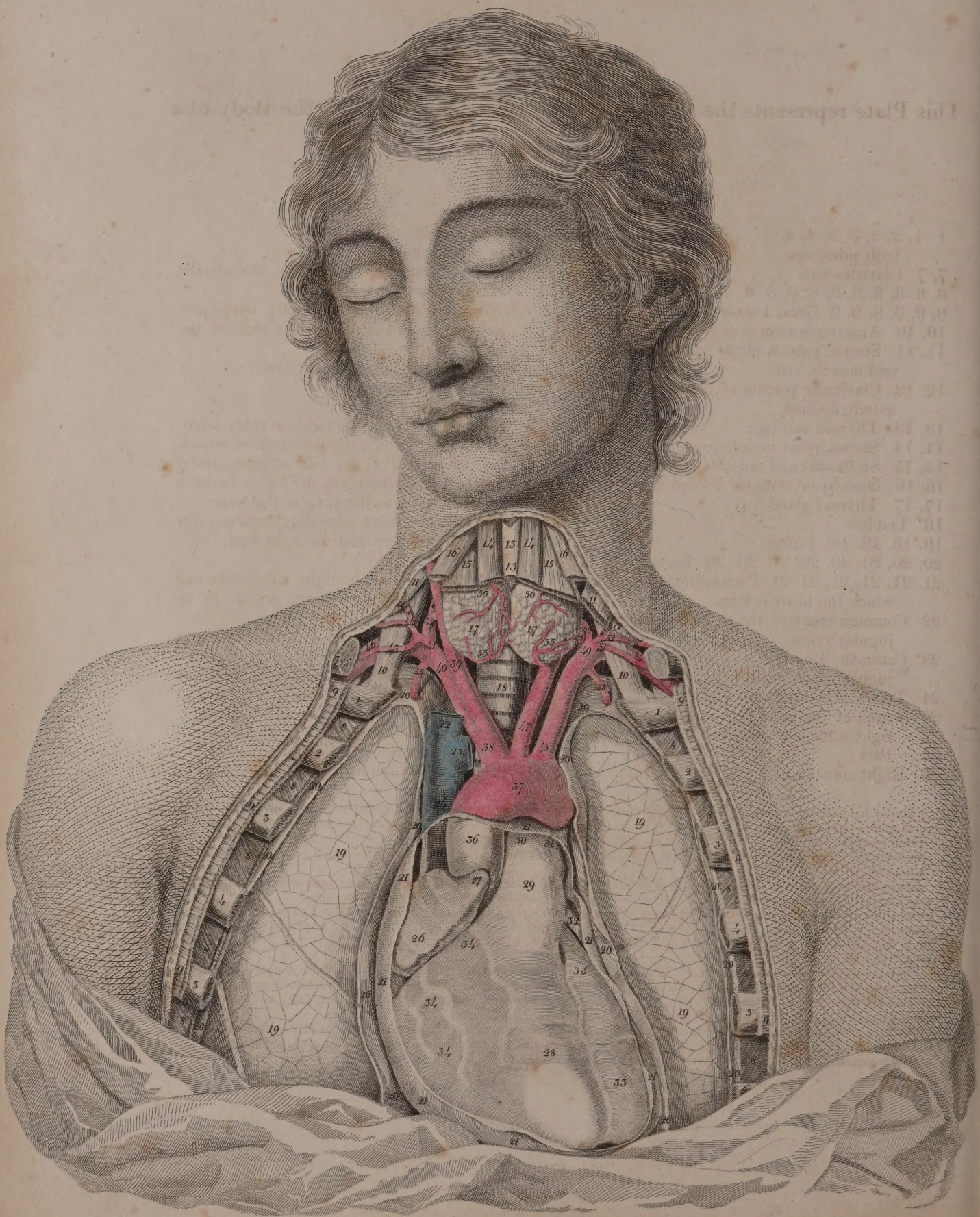
To those who have often investigated the constitution of the human body, an opportunity of seeing and observing such circumstances as tend to illustrate either the regular or irregular conformation of the body will have frequently presented itself. It is indisputably acknowledged, that no part of our frame varies so frequently, or in so whimsical a manner, in their origin, course, and distribution, as the blood-vessels. This fact is well established by the united testimony of many anatomists. Indeed it is difficult to establish, in any case, what variety would best suit the economy of an animal, what least; nevertheless all are highly worthy the attention of the careful examiner into our constitution. As certainly a knowledge of the natural origin and distribution of the vessels may be reckoned the thing chiefly necessary, and deservedly too, to the surgeon or physician, yet the recollection of their variations is by no means without its utility, but renders us the more capable of mastering those difficulties which so easily arise to interrupt our prognosis, and foil us in our operations. Surgeons and physicians, from a knowledge of these varieties, may usefully elicit many salutary advantages to men who are either wounded or inflicted with disease. When I was yearly in the custom of dissecting a remarkable number of bodies, and of publicly and privately demonstrating their anatomy, and was engaged also in showing many young men how they should dissect, that they might obtain a knowledge of the structure and functions of the body, and become skilful anatomists, good surgeons, and able physicians, it could not happen but that I would meet with many points of use both to surgeons and physicians. I have carefully noted the varieties of the arteries from a great number of bodies which I examined for the purpose of perfecting this work; and I have caused those, in particular, to be delineated which can either impede the functions of a part, or be of interest to the surgeon in the prosecution of his profession.

The celebrated ROUX, much skilled in engraving, has very accurately represented the true and proper structure, situation, figure, order, and connexion of each part, from dissections upon the body. In the muscles he has expressed the linearity of their fibres; the arteries he has represented by transverse lines; the nerves and glistening tendons by dotted points placed horizon-

tally : and shaded the remaining organs and parts in different ways, according to their natural appearance. The lithographic printers, among whom C. F. MULLER of Carlsruch is pre-eminent, have transferred these plates to stone under my own inspection, and after the most approved rules of the art.

When in any of the plates many arteries are represented, the branches are very often so small and frequent, that in linear plates it would be impossible to refer conveniently, by means of figures, to each individual one. I have, therefore, omitted referring to the smaller twigs, lest by too great a number of references I should impair the perspicuity of the whole. However, I deem it necessary to remind you, that if in any particulars the references may slightly differ, and not exactly fall upon the point indicated, this is owing to the barrenness of the minutiæ ; in those places in which this could not be avoided, what is meant will be easily understood by men but moderately skilled in the science.

PL. I.



E. Mitchell Sculpt.

PLATE I.

This Plate represents the situation of the Heart and Aorta in the Body of a Man 24 years of Age.

1, 1, 2, 2, 3, 3, 4, 4, 5, 5, 6. Superior ribs of both sides, cut.
7, 7. Clavicles cut.
8, 8, 8, 8, 8, 8, 8, 8, 8, 8. Intercostal muscles.
9, 9, 9, 9, 9, 9. Great Pectoral muscles.
10, 10. Anterior scaleni muscles.
11, 11. Sternal portion of the sterno-cleido mastoid muscle, cut.
12, 12. Clavicular portion of the sterno-mastoid muscle divided.
13, 13. Thyroid cartilage.
14, 14. Sterno-hyoid muscles, cut.
15, 15. Sterno-thyroid muscles divided.
16. 16. Omo-hyoid muscles divided.
17, 17. Thyroid gland.
18. Trachea.
19, 19, 19, 19. Lungs.
20, 20, 20, 20, 20, 20, 20, 20. Pleurae.
21, 21, 21, 21, 21. 21. Pericardium laid open, in which the heart is seen.
22. Common trunk of the right subclavian and jugular veins.
23. Common Trunk of the left subclavian and jugular veins, or thoracic jugular vein.
24. Trunk of the vena cava superior.
25. Trunk of the same vein descending into the right sinus, the pericardium being turned back.
26. Right sinus or atrium cordis dextrum.
27. Right auricle.
28. Right or pulmonary ventricle.
29. Pulmonary artery arising from the arterial cone of the right ventricle.
30. Right branch of the pulmonary artery proceeding to the lung under the arch of the aorta.
31. Left branch of the pulmonary artery.
32. Left auricle.
33. Left or aortic ventricle.
34, 34, 34. Branches of the right coronary artery of the heart which the pericardium covers.
35. Anterior branch of the left coronary artery of the heart running in the hollow between the ventricles to the apex of the heart.
36. Trunk of the aorta ascending between the pulmonary artery and the right sinus.
37. Arch of the aorta.[a]
38. Common trunk of the right subclavian and carotid arteries, anonymous trunk, or arteria innominata.

    The length of the arteria innominata varies much in different individuals; I have seen it longer in tall people and shorter in those with a short neck.
39. Right carotid artery.
40. Right subclavian artery.
† Vertebral artery.
41. Trunk of the inferior thyroid artery.

[a] Haller (de partium corporis humani praecipuarum fabrica et functionibus T. 4, p. 7.) speaks in the following manner of the branches arising from the arch of the aorta. "In man alone, of all animals I have yet examined, three distinct branches have "arisen from the convexity of the great arch, so that, correctly speaking, we cannot use the word ascending aorta. The first of "these trunks is the right subclavian, which gives off the right carotid; the second the left carotid; and the third the left "subclavian of the same side."

I have distinctly observed the same origin of the vessels arising from the arch of the aorta in the simia aetheops, sciurea, and capucina, in the hedgehog, mole, rat, and mouse, beaver, three-toed sloth, and dolphin of the ancients.

Dubenton has seen this disposition of the vessels in the simia sciurea, (Buffon Hist. Natur. T. 15. p. 47.) capucina, (ib. p 57.) rosalia, (ib. p. 113.) appella, (T. 15, p. 49.) lemur tardigradus. (ib. T. 13. p. 217.) racoon, (ib. T. 8. p. 348,) two-toed sloth, (ib. p. 56.) two-toed ant-eater, (ib. T. 10. p. 171.) hamster, (ib. T. 8. p. 130.) mus decumanus, (ib. T. 8. p. 212.) and beaver, (ib. p. 316.)

Ducrotay de Blainville, (Dissertation sur la place, que la famille des Ornithorinques et des Echidnes doit occuper dans les series naturelles, Paris 1812, p. 34.) has taken notice of the distribution of vessels in the ornithorynchi and echidnae. J. F. Meckel has seen it in the three-toed sloth, (Beiträge zur vergleichenden anatomie, B. 2. Heft. 1. S. 130.) and two-toed ant-eater, (Deutsch. Archiv fur die Physiologie, B. 5. S. 59.)

But it is to be remarked, that the origin of the trunks arising from the arch of the aorta is subject to vary in mammalia as well as in men; for in the simia capucina and racoon I have seen only two branches proceeding from the arch, the first and greater of which consisted of the arteria anonyma, the posterior and smaller of the left subclavian.

42. Proper thyroid branch.
43. Transverse artery of the scapula.
44. Superficial cervical artery.
†† Ascending cervical artery.
45. Internal mammary or thoracic artery.
46. Trunk of the subclavian artery, proceeding between the scalenus anticus and medius muscles.
47. Left carotid.
48. Left subclavian artery.
* Vertebral artery.
49. Inferior thyroid artery.
50. Thyroid branch.
** Ascending vertebral artery.
51. Transverse artery of the scapula.
52. Superficial cervical artery.
53. Left mammary artery.
54. Subclavian artery running between the scaleni and descending obliquely over the first rib.
55, 55. Branches of the inferior thyroid artery.
56, 56. Branches of the superior thyroid artery.

Fig 1.

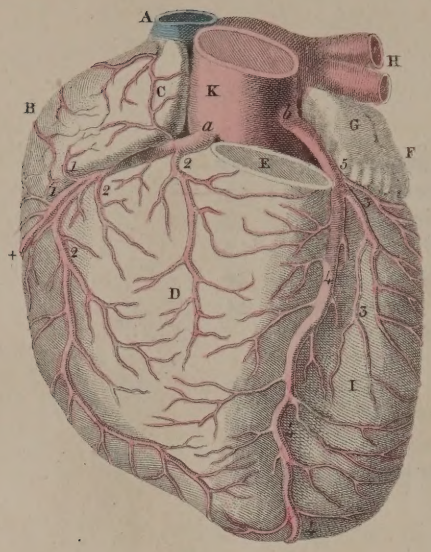


Fig 2.

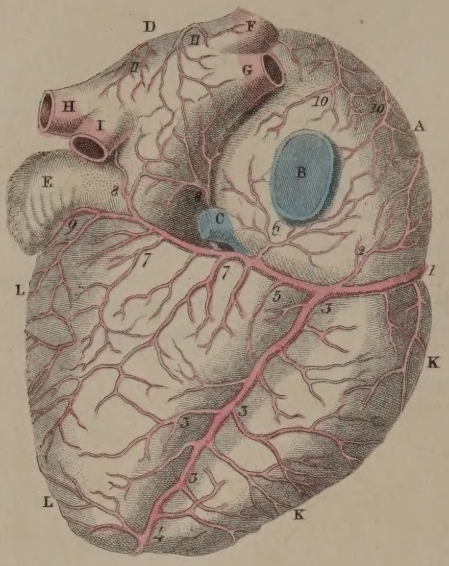


Fig 3.

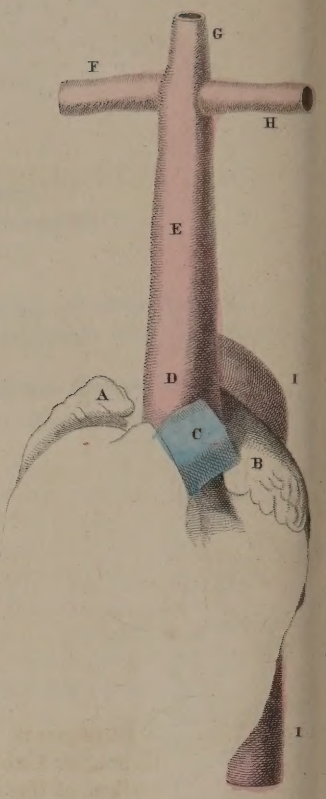


Fig 4.

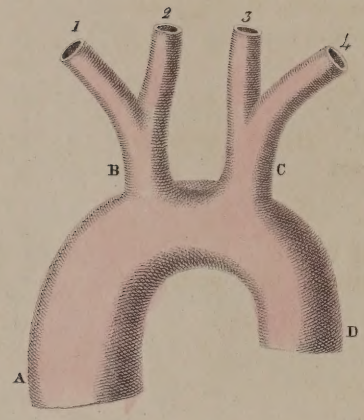


Fig 5.

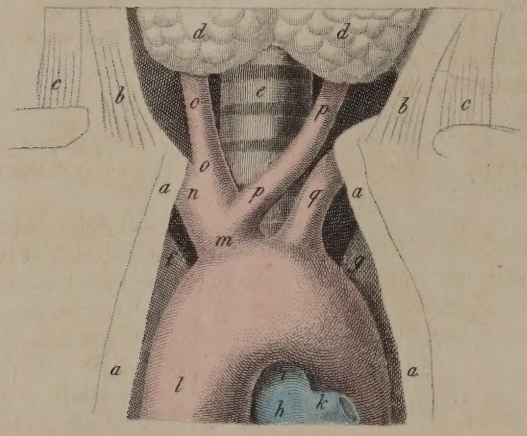


Fig 6.

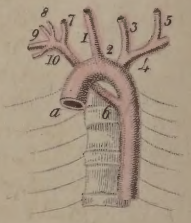


Fig 7.

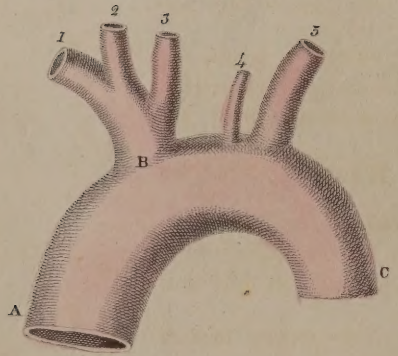


Fig 8.

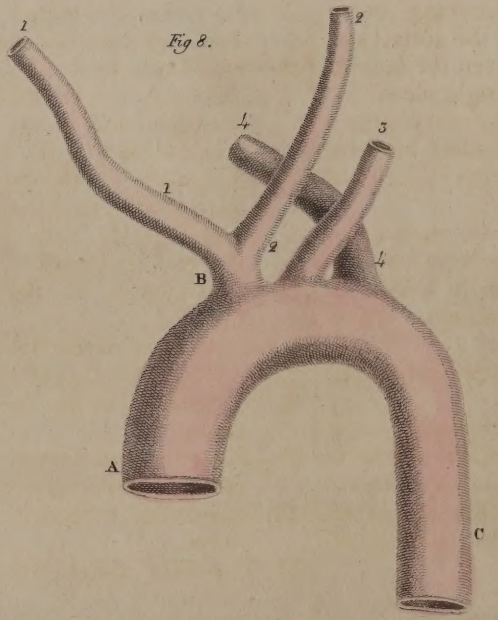
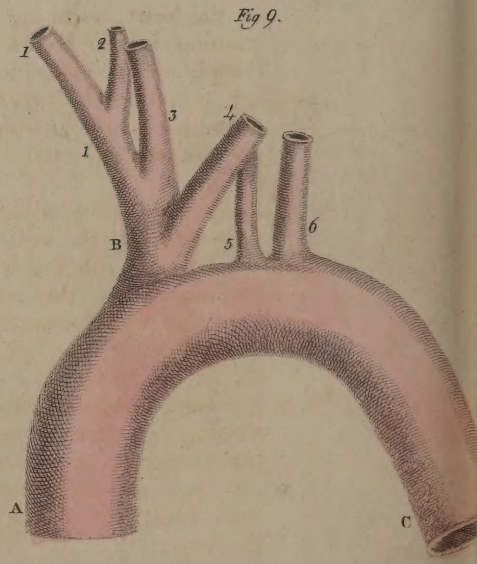


Fig 9.



E. Mitchell Sculp.

PLATE II.

FIGURE I.

Represents the Coronary Arteries of the Heart, or Cardiac Arteries, upon the Anterior surface of the Heart.

A—Trunk of the vena cava superior, cut.
B—Right sinus.
C—Right auricle.
D—Pulmonary ventricle.
E—Arterial cone, with the pulmonary artery divided, that the origins of the cardiac arteries may be better seen.
F—Left sinus.
G—Left auricle.
H—Left pulmonary veins.
I—Aortic ventricle.
K—Trunk of the aorta.
a—Right anterior or inferior coronary artery of the heart, escaping from the aorta, and running in the hollow between the base of the pulmonary ventricle and right sinus.
b—Left posterior or superior coronary artery of the heart arising from the aorta between the pulmonary artery and left auricle of the heart.
1,1,1.—Branches proceeding from the right coronary artery to the sinus of the venæ cavæ.
2,2,2.—Branches running to the right ventricle.
*—Continuation of the right coronary artery upon the posterior surface.
3,3.—Branches of the left coronary artery to the left ventricle.
4, 4, 4.—Great anterior branch running in a winding manner in the hollow between each ventricle to the apex of the heart, and then reflected between the apices of both ventricles to the inferior surface of the heart.
5.—Tortuous branch proceeding to the posterior surface of the heart.

FIGURE II.

Represents the Cardiac Arteries upon the Posterior surface of the Heart.

A—Right sinus.
B—Mouth of the vena cava inferior.
C—Trunk of the great coronary vein terminating in the right sinus.
D—Left sinus.
E—Left auricle.
FG—Right pulmonary veins.
HI—Left pulmonary veins.
K. K.—Pulmonary ventricle.
L L—Aortic ventricle.
1.—Posterior circumflex branch of the right coronary artery of the heart.
2.—Small twig to the right sinus.
3, 3, 3, 3.—A branch descending between each ventricle, and giving branches to the posterior surface of the ventricles.
4.—A branch of the left coronary artery reflected between the apices of the ventricles, and entering into anastomosis with the descending branch.
5.—Continuation of the posterior circumflex branch.
6.—Small twig to the right sinus.
7, 7.—Twigs running to the left ventricle.
8, 8.—Small branches proceeding to the left sinus.
9.—Posterior anastomosing circumflex branch of the left coronary artery.
10, 10.—Small reflected branch of the right sinus.
11, 11.—Small twigs of the left sinus.

The coronary arteries of the heart sometimes differ in their number and distribution from what I have here represented. THEBESIUS[a] has observed only one, though a large trunk, arising from the aorta, and immediately dividing into two branches. WINSLOW[b] and FIORATI[c] have both noticed three coronary arteries.

The following figures exhibit the principal varieties of the aorta, and of the branches arising from its arch: for, the branches of the aorta do not always originate in the same manner; nor are they distributed in all bodies after the same law, even although they do arise in the usual way. I have here laid down those varieties in the origin and course of the trunks arising from the arch of the aorta, which I have either myself observed,[d] or seen depicted and described in the works of other anatomists.

FIGURE III.

Represents the most uncommon variation of the aorta, which KLINZ[e] observed in the body of a soldier twenty years of age. The aorta forms no arch, but after emerging from the left ventricle immediately divides into an ascending and descending trunk, one of which gives off both carotids and subclavians.[f]

A—Right auricle of the heart.
B—Left auricle of the heart.
C—Pulmonary artery.
D—Trunk of the aorta.
E—Ascending aorta.
F—Trunk of the right subclavian and carotid arteries.
G—Left carotid.
H—Left subclavian.
I I—Descending aorta.

FIGURE IV.

Sometimes two common or anonymous trunks arise from the arch of the aorta, one of which gives off the carotid and subclavian arteries of the right side, the other the same vessels of the left side. This variety has been twice observed by VINC MALACARNE,[g] and once by BIUMI.[h] I have seen it in the Anatomical Museum of Berlin.

A—Aorta.
B—Right common trunk.
1.—Right subclavian artery.
2.—Right carotid artery.
C—Left common trunk.
3.—Left carotid.
4. Left subclavian.
D—Descending aorta.

FIGURE V.

There are very often only two trunks originating from the arch of the aorta, the first and larger of which is composed of both carotid and right subclavian arteries, the second and smaller of the left subclavian.

a, a, a, a.—Sternum of an adult cut in its middle part.
b, b.—Sternal portions of the sterno-cleido mastoid muscles.
c, c.—Clavicular portions of the same muscles.
d, d.—Thyroid gland.
e.—Trachea.
f.—Right pleura.
g.—Left pleura.
h.—Trunk of the pulmonary artery.
i.—Right pulmonary artery.
k.—Left pulmonary artery.
l.—Trunk of the aorta.
m.—Arteria innominata, which is sometimes observed longer.

a Diss. de Circulo Sanguinis in Corde. Lugd. Batav. 1716, 8, p. 6.
b Exposition Anatomique de la Structure du Corps Humain. Paris, 1732, p. 366.
c Atti della Academia di Padua, T. 3. P. I. p. 38.
d J. N. Bayer, praes. F. Tiedemann. Diss. de ramis ex arcu aortae prodeuntibus. Salzburg, 1817. 4. cum tab. lithograph.
e Abhandlungen der Josephinischen Medicinisch-Chirurgischen Akademie. Wien. 1787. B. I. S. 271. Taf. 6.
f This distribution of the aorta occurs in animals of the order Pecora, in the sheep, goat, bull, stag, buck, reindeer, (Daubenton, l. c. T. 12. p. 182;) both varieties of the camel, (Daubenton, T. 11. p. 260, p. 432;) chamois, (Dauberton. T. 12. p. 182;) also in the solidungula, the horse, ass, and zebra, (Daub. T. 12. p. 17;) in most of the belluae, *v. gr.* in the boar, the pecari, and rhinoceros, (Cuvier Anatomie Comparée, T. 4. p. 248.) It is rarely observed in the mammalia of the order Glires and Quadrumana, yet I have seen it in the cavia agouti, and in the lemur mongoz. Daubenton has remarked it in the cavia cabybara (T. 12. p. 292.) and paca, (T. 10. p. 276,) in the lemur mongoz, (Tit. 13. p. 201,) and ring-tailed lemur, (ib. p. 189.)
This disposition of the vessels seems to be peculiar to those mammalia provided with a long neck; and from it seems to have arisen the vulgar division of the human aorta into ascending and descending, which we find so often mentioned in the works of the older Anatomists.
g Osservazione in Chirurgia, Torina, 1784, T. 2. p. 119.
h Observationes Anatomicae, p. 133.
I have remarked this distribution of the vessels in the bat; the left arteria anonyma was shorter than the right. Daubenton has observed it in the pteropus rufus, (T. 10. p. 70.) The other animals of the class Cheiroptera obviously have this arrangement of vessels. It is found also in the porpoise. (Cuvier. Anat. Compar. T. 4. p. 249.)
It would appear that this distribution is chiefly to be met with in those of mammalia with short necks.

n.—Right subclavian artery.
o, *o*.—Right carotid artery.
p, *p*.—Left carotid, passing obliquely across the trachea.
q. Left subclavian.

This variety, which some of the older anatomatists have either delineated or described as usual and regular, has been often observed in more recent times. PETSCHE[a] has seen it once in the body of a female. NEUBAUER[b] twice in adults, and once in a new born infant. J. J. HUNTER[c] in a girl six years old, and in a boy of twelve. Besides, we have the authority of J. F. MECKEL,[d] VINC. MALACARNE,[e] WALTER,[f] SCARPA, BURNS,[g] RYAN[h] and J. F. MECKEL, (the grandson[i]) in establishing this variation.

I have myself very often seen this disposition of these arteries in males as well as females, while studying at Landishut; but seldom in those bodies which I procured while at Marburg, Wirceburg, and Heidelberg.[k]

The left carotid, when it arises from the arteria innominata always passes obliquely across the trachea between the manubrium of the sternum and the thyroid gland; for which reason the anterior surface of the neck, in performing the operation of tracheotomy, should be carefully examined by the surgeon lest he wound this artery.*

FIGURE VI.

A variety which I have remarked in a fœtus of eight months. This fœtus had a hare-lip.

A—Aorta.
1.—Right carotid.
2.—Anonymous trunk.
3.—Left carotid.
4.—Left subclavian.
5.—Vertebral artery of the same side.
6.—Right subclavian artery arising from the thoracic aorta.
7.—Right vertebral artery.
8.—Inferior thyroid artery.
9.—Transverse artery of the neck.
10.—Internal mammary artery.

FIGURE VII.

Exhibits a variety, which I observed in the body of an adult man at Landishut.

A—Aorta.
B—Arteria innominata.
1.—Right subclavian artery.
2.—Right carotid.
3.—Left carotid.
4.—Vertebral artery of the left side.
5.—Left subclavian.
C—Thoracic aorta.

[a] Sylloge Anatomicarum Selectarum Observationum. Hal. 1736, p. 14.
[b] Descriptio Anat. Arteriae Innominatae et Thyroideae Imae. Jenae, 1772, § 11. Tab. 2. Fig. 1.
[c] Act Helvetic, Vol. 8. p. 71. Tab. 3. Fig. 1.
[d] Epistolae ad Hallerum, Vol. 3. p. 140.
[e] Osservaz. in Chirurgia, P. 2. p. 128. Tab. 1. Fig. 3.
[f] Nouveaux Memoires de l'Acad. de Berlin, Ann. 1785, p. 61. Tab. 2. Fig. 5. I am surprised that Walter has called this variety a very rare one.
[g] Von den Herzkrankheiten, a. d. Engl. Lemgo, 1813, s. 324.
[h] Diss. de Quarundum Arteriarum in Corpore Humano Distributione. Edinburg. 1812. 8. p. 2.
[i] Tabulae Anatomicae Pathologicae Fasc. 2. Tab. 10. Fig. 11. Handbuch der Pathologischen Anatomie. B. 2. Abth. 1. s. 131.
Meckel asserts that he has seen this distribution twelve different times.
[k] In many animals I have observed both carotids and the right subsclavian arising by a common trunk from the aorta. In animals of the order quadrumana, viz. in the simia satyrus, ‡ whose heart I saw preserved in the celebrated museum of Sandifort at Leyden; in the simia entellus, the magot, sajou sai, coaita, green ape or callitriche, red ape of Senegal, simia artesus, brown baboon, and pigtailed baboon. Daubenton saw the same type or distribution of vessels in the magot, (l. c. T. 14. p. 119.) the pig-tailed baboon, (p. 183,) the cynomolgus, (p. 198,) the faunus, (p. 233,) the green ape, (p. 279,) the fuliginosa, (p. 250,) and coaita. (T. 15. p. 30.)
I have found the same disposition of vessels in the dog, (l. c. Fig. 3.) fox and wolf, and cat, (l. c. Fig. 5.) lion and weasel, (Fig. 4.) martin or polecat, and ermine, the yellow and red coati mondi, racoon and badger. Besides, according to Daubenton, it is met with in the hyæna, (l. c. T. 9. p. 285,) leopard, (p. 181.) ounce, (p. 212,) lynx, (p, 248,) caracal, (T. 12. p. 445,) civet or musc, common otter, (T. 7. p. 143,) and bear, (T. 8. p. 271.)
Finally, I have seen it in most of the Glires, *v. gr.* in the hare, (Fig. 6.) rabbit, porcupine, beaver, and alpine mouse. Daubenton described it in the sciurus palmarum, (T. 10. p. 135.) the Guinea pig, (T. 8. p. 11,) and didelphis, (T. 13. p. 98.) Pallas showed it in the daman of the Cape. (Miscellanea Zoologica, p. 43.)

(‡ I have followed the learned author in the text, in retaining the name of *Simia Satyrus*, though it is now tolerably well ascertained that the simia satyrus of naturalists, the animal described by Vosmaer and Camper, is only a young pongo. The heart preserved in the museum at Leyden may perhaps have belonged to the very specimen so ably dissected and described by Camper.— R. KNOX.)

(* There is a specimen of the distribution of vessels, described in the text, in my own museum. I owe the preparation to the kindness of Mr. Turnbull, one of my pupils.—R. KNOX.)

Figure VIII.

Shows the arch of the aorta, from which a trunk common to both carotids arises, and each subclavian formed by a trunk proper to itself, and originating in a singular manner, so that the left subclavian is situated in the middle, while the right is placed on the left side. This figure is taken from the observations of Walter.

A—Ascending aorta.
B—Common trunk of the carotids.
1, 1,—Right carotid.
2, 2—Left Carotid.
3—Left subclavian artery.
4—Right subclavian artery behind those trunks proceeding to the right side.
C—Portion of the thoracic aorta.

Hunauld,[a] Hommel,[b] Neubauer,[c] J. F. Meckel,[d] Walter,[e] and J. F. Meckel, (the grandson[f]) have each remarked the branches of the arch of the aorta arising in this manner The right-subclavian generally proceeds behind the oesophagus and trachea to the right arm; but, in the case which Walter describes, it runs over the trachea.

Figure IX.

Represents a variety observed by Walter,[g] agreeing completely with Fig. vii.

A—Aorta.
B—Arteria innominata.
1, 1.—Right subclavian artery.
2.—Vertebral artery.
3.—Right carotid.
4.—Left carotid.
5.—Left vertebral artery.
6.—Left subclavian.
Ed. Sandifort[h] describes a similar case as occurring in the body of a female.

a Hist. de l'Acad. des Sciences de Paris, an. 1737, p. 20, Nro. 7.
b Commercium Litterarium Norimberg. 1737, p. 162, Tab. 2. Fig. 3, 4. e viro adulto.
c De Arteria Innominata, § 12.
d Epistol. ad Haller. T. 3. p. 141.
e Mem. de l'Acad. de Berlin, 1785, T. 3. Fig. 3.
f Tabulae Anatomicae-Pathologicae, Fasc. 2. Tab. 10. Fig. 2.
g l. c. Tab. 3. Fig. 3.
h Observationes Anatomicae-Pathologicae, Lib. 4. p. 92.

Fig. 1.

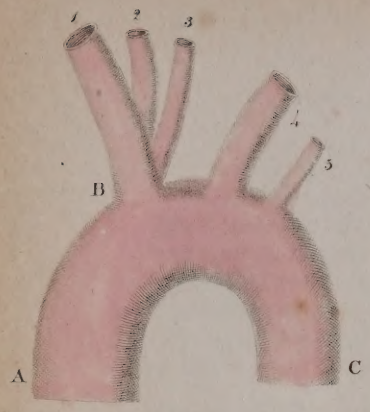


Fig. 2.

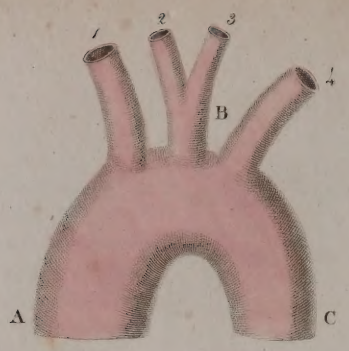


Fig. 3.

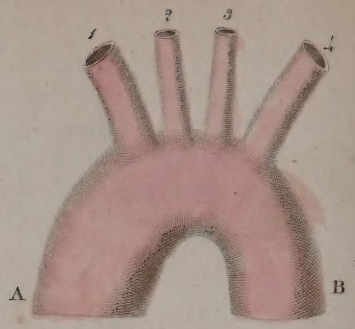


Fig. 5.

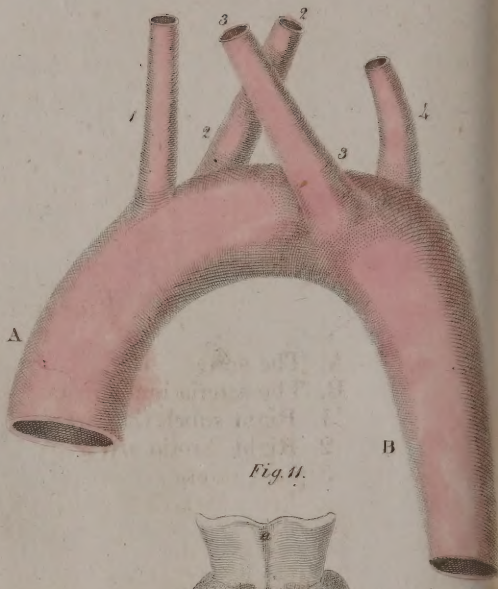


Fig. 6.

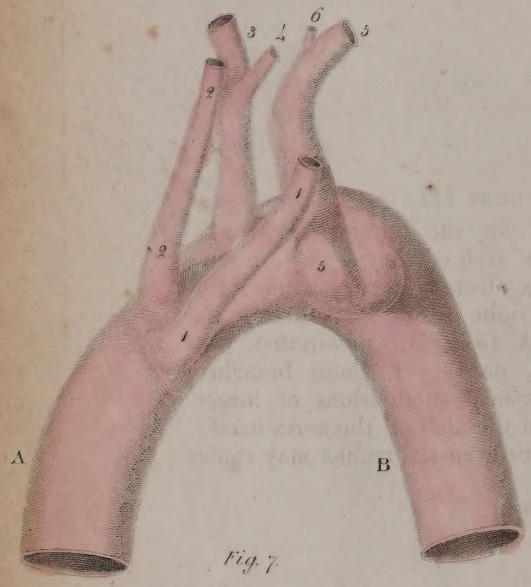


Fig. 4.

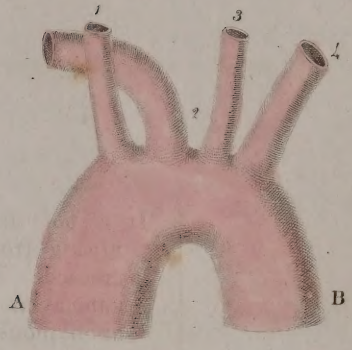


Fig. 8.

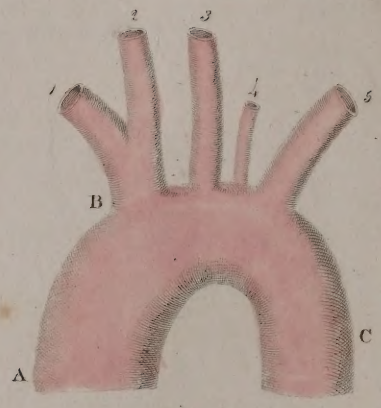


Fig. 11.

Fig. 7.

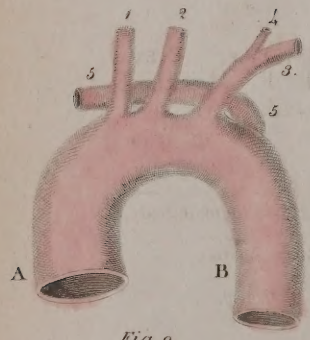


Fig. 9

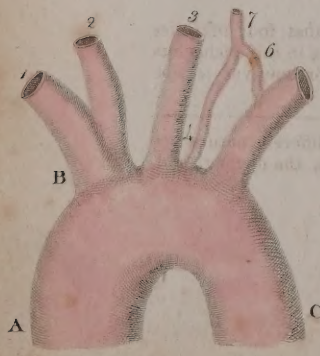


Fig. 10.

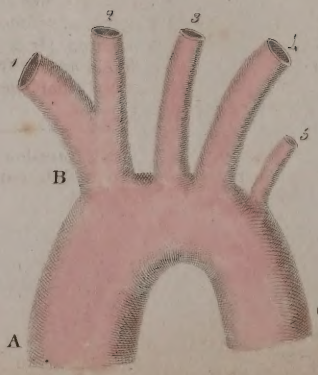
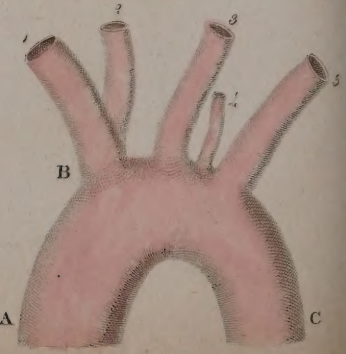


Fig. 12.



E. Mitchell fecit.

PLATE III.

Figure I.

A. The aorta.
B. The arteria innominata.
1. Right subclavian artery.
2. Right carotid artery.
3. Left carotid.
4. Left subclavian artery.
5. Left vertebral artery arising from the arch of aorta.
C. Thoracic part of the aorta.

I saw this disposition of the vessels in the body of a man forty years old; it is like that described by Walter.*

Figure II.

This very rare variety occurred to me whilst dissecting the body of a young person aged twenty-two.†

A. Ascending trunk of the aorta.
1. Right subclavian artery.
B. Trunk common to the two carotids.
2. Right carotid.
3. Left carotid.
4. Left subclavian.
C. Descending aorta.

* Museum Anatomicum, p. 237, No. 1447.

† This origin of the branches from the arch of the aorta is proper to the elephant.—See Cuvier, (l. c. Vol. 4. p. 249.)

Figure III.

It is not unusual for the number of trunks arising from the arch of the aorta to be increased. This is effected, partly, if the right subclavian and right carotid arteries form no anonymous trunk (*arteria innominata*), but arise separately, partly, if those branches which are commonly subdivisions of larger trunks arise from the arch of the aorta itself; thus four, five, or even six trunks may come off from it.

A, B. Arch of the aorta.
1. Right subclavian artery.
2. Right carotid.
3. Left carotid.
4. Left subclavian.

Heister,[1] Winslow,[2] Ballay,[3] Neubauer,[4] Nevin,[5] Ryan,[6] J. F. Meckel,[7] Zagorsky,[8] and Fleischmann,[9] have seen such a distribution of branches arising from the arch of the aorta.

[1] Compendium Anatomicum. Notæ, p. 123, in a female body.
[2] l. c. p. 364.
[3] Journal de Medicine. Ann. 1758. Mois Avril.
[4] l. c. § 14.
[5] Edinburgh Med. Commentaries. Dec. 2. Vol. 9.
[6] l. c. p. 3.
[7] Patholog. Anat. B. 2. Abth. 1. S. 107.
[8] Mem. de l'Academ. de Petersbourgh, T. 1.
[9] Leichen—Oeffnungen, S. 236.

Daubenton (l. c. T. 13. p. 420,) says, that four branches were found arising from the arch of the aorta in the trichechus rosmarus;* that they agree with the above however is not quite evident.

* This expression has been employed by different naturalists to designate different animals, as the walrus, the dugong, and the lamentine.

FIGURE IV.

A, B. Arch of the aorta.
1. Right carotid.
2. The right subclavian going behind the carotid of the same side, on its way to the right arm.
3. Left carotid.
4. Left subclavian.

J. J. HUBER* saw this disposition.

FIGURE V.

Exhibits a variety taken from †WALTER's Dissertation on the aberrations of the arteries.

A, B. Arch of the aorta.
1. Right carotid artery.
2. Left carotid artery.
3. Right subclavian artery.
4. Left subclavian artery.

FIGURE VI.

A similar variety taken from the observations of WALTER.‡

A, B. Arch of the aorta.
1. Right carotid.
2. Left carotid.
3, 3. Right subclavian.
4. Vertebral artery.
5, 5. Left subclavian.
6. Vertebral artery.

FIGURE VII.

This figure is taken from the Programma of P. A. BOEHMER.‖

A, B. Arch of the aorta.
1. Right carotid artery.
2. Left carotid.
3. Left subclavian.
4. Vertebral artery of the left side.
5. Right subclavian running behind the œsophagus and trachea, on its way to the right side.

* Acta. Helvetic. T. 8. p. 75. Fig. 3.

† Mem. de l'Acad. de Berlin, 1785. p. 62. Tab. 3. Fig. 5. From a male body.

‡ Ib. Tab. 3. Fig. 4.

‖ De quatuor et quinque ramis ex arcu arteriæ magnæ adscendentibus. Halæ, 1744, Fig. 1.

This anomaly of the vessels has been described by FABRICIUS,[1] MIEG,[2] LOESECKE,[3] LUDWIG,[4] POHL,[5] NEUBAUER,[6] MURRAY,[7] SCHLEITZ,[8] SANDIFORT,[9] BAYFORD,[10] HULME,[11] AL. MONRO,[12] AUTENREITH,[13] ZAGORSKY,[14] KOBERWEIN,[15] HEROLD,[16] FLEISCHMANN,[17] OTTO,[18] and J. F. MECKEL.[19]

The right subclavian artery immediately at its origin is bent towards the right, and proceeds obliquely or transversely to the right arm. In its course it either runs behind the œsophagus and trachea, as in the cases observed by BOEHMER, NEUBAUER, POHL, MURRAY, SCHLEITZ, AUTENREITH, FLEISCHMANN, and OTTO; or it passes between the œsophagus and trachea, as in the cases described by BAYFORD, MONRO, ZAGORSKY, and HEROLD. Some physicians, BAYFORD, HULME, MONRO, AUTENREITH, and MURRAY, relate that deglutition has been impeded by this irregular origin and course of the right subclavian artery, and they derive from thence a new sort of Dysphagia which they call *Lusoria*. But others, KOBERWEIN, OTTO, and FLEISCHMANN, have not observed Dysphagia to arise from this cause.

1 Proemticum non nullas observationes anatomicas sistens ad diss. J. B. Hoffmann. Helmst. 1751. p. 10.

2 Specimen Observationum Anatomicarum atque Botanicarum. Basil. 1753. Art. 8.

3 Observationes Anatomico-Chirurgico-Medicae. Berolin, 1754. p. 26.

4 Programma observationes angiologicas tradens. Lips. 1764. p. 5.

The right mammary artery arose in the same subject from the right carotid.

5 Observationes Angiologicæ de Arteriis. Lips. 1773. p. 7.

6 l. c. § 13.

7 Abhandlungen der Schwed. Akadem. B. 30. S. 92.

8 Ib. p. 98.

9 Museum Anatomicum, Acad. Lugd. Batav. Tab. 106. Fig. 2.

10 Memoirs of the Medical Society of London, Vol. II. p. 271. In the body of a Female aged sixty.

11 Ib.

12 De Dysphagia. Edinb. 1797. Outlines of the Anatomy of the Human Body. Edin. 1813. Vol. III. p. 277. Plate 43.

13 Pfleiderer Praes. Autenrieth, Diss. de Dysphagia Lusoria. Tubing, 1806, in a female body aged sixty. Reils Archiv. für die Physiologie, B. 7. s. 145.

14 Mem. de l'Acad. des Sc. de St. Petersbourg, 1810. T. 2. p. 318. Tab. 2. Fig. 7. From the body of a boy.

15 Diss. de vasorum decursu abnormi ejusque vi in omnem valetudinem varia. Vitenberg, 1810, p. 16.

16 Diss. exhibens Observationes quasdam ad Corp. Hum. Part. Struct. Marburgi, 1812, p. 7.

17 Leichenoffnungen. Erlangen, 1815, S. 213. From the body of a man aged fifty-nine.

18 Seltene Beobachtungen Zur Anatomie, Physiologie und Pathologie, Breslau, 1816, 4. S. 100.

19 Handbuch, der Patholog. Anatomie, B. 2. Abth. 1. S. 98.

Figure VIII.

This shews an unusual origin of the left vertebral artery from the arch of the aorta between the left carotid and subclavian arteries, which I saw in the body of a man of fifty.

A. Aorta.
B. Arteria innominata.
1. Right subclavian artery.
2. Right carotid.
3. Left carotid.
4. Vertebral artery of the left side.
5. Left subclavian artery.
C. Descending aorta.

This variety very frequently occurs. It has been observed by J. G. de Bergen,[1] Petsche,[2] Trew,[3] Loeseke,[4] Boehmer,[5] Morel,[6] Huber,[7] Morgagni,[8] Winslow,[9] Barbaut,[10] Mekel,[11] Sandifort,[12] Niemeyer,[13] and J. F. Meckel the grandson.[14] I have seen this anomaly five times in males as well as in females.

Figure IX.

Exhibits a very rare variety of the left vertebral artery, which Huber* saw in the body of a boy.

A. Aorta.
B. Arteria innominata.
1. Right subclavian artery.
2. Right carotid.
3. Left carotid.
4. The first left vertebral artery arising from the arch of the aorta.
5. Subclavian artery of the left side.
6. Another left vertebral artery coming off from the subclavian.

Both these, viz. that which is a branch of the aorta, and that which comes from the subclavian, joined into one at the transverse process of the fifth cervical vertebra.

7. Common trunk of the vertebral arteries.

Henkel* likewise found two vertebral arteries on the left side, one of which, the smaller, came from the usual place; the other, the larger, arose from the aorta; they formed a common trunk in the canal of the transverse processes of the neck.

Figure X.

A. Aorta.
B. Arteria innominata.
1. Right subclavian.
2. Right carotid.
3. Left carotid.
4. Left subclavian.
5. Vertebral artery deriving its origin from the arch of the aorta.

I saw this anomaly in the body of a man thirty years old. Winslow,[1] and J. F. Meckel,[2] have observed a similar distribution.

Figure XI.

This figure exhibits the inferior thyroid artery, coming off from the arch of the aorta between the arteria innominata and the left carotid. Neubauer† was the first who described this.

a.—Thyroid cartilage.
b, *b*.—Thyroid gland.
c.—Trachea.
A. Aorta.
B. Arteria innominata.
1. Right subclavian.
2. Right carotid.

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[1] Acta Eruditor. Lips. Ann. 1698, p. 295. Tab. 7.
[2] l. c. pag. 14.
[3] Commerc. Liter. Norimberg. Ann. 1737, p. 185, No. 2.
[4] l. c. p. 26.
[5] Observation. Anat. Rarior. Fasc. 1. p. 11. No. 15. In a female body.
[6] Journal de Medicine, 1757. Dec.
[7] l. c. He saw this structure in a new born infant, and in one fifteen days old, in a boy of one year, in a girl of two, and another of five years old, and in an old woman.
[8] De Sedib. et Causis Morbor. Epist. 3. Art. 20, 21. Epist. 15, Art. 26. Epist. 56. Art. 10. and 21.
[9] l. c. No. 21.
[10] Angiolog. p. 387.
[11] Epistolae ad Hallerum. T. 2. p. 258.
[12] Observat. Anat. Patholog. Lib. 4. p. 92. In a female body.
[13] De Fetu Puellae Abnorm. Hal. 1814, p. 7.
[14] Hanb. der Patholog. Anat. B. 2. Abth. 1. s. 109.

Tabul. Anatomic. Pathologic. Fasc. 1. Tab. 1. Fig. 3. In the body of a young person of fourteen, who died of the blue disease, *(morbus caeruleus.)*

This distribution of the arteries from the arch of the aorta seems to be regular in the seal; for I observed it in three seals dissected by myself.

* l. c. p. 73.

* Zweite Sammlung Medicinischer und Chirurgischer, Anmerkungen, S. 10. Fig. 4.

[1] l. c. p. 364. [2] l. c. p. 109.

† De Arteria Innominata et Thyreoidea ima, § 8. Tab. 2. Fig. 2.

3. Inferior thyroid artery, sending small branches to the trachea and thyroid gland.
4. Carotid of the left side.
5. Left subclavian.

C. Thoracic part of the aorta.

It is worthy of notice, that in this case the right inferior thyroid artery, a branch of the subclavian, gave no twigs to the thyroid gland; but that the scapular, the transverse cervical, and ascending cervical arteries, chiefly supplied it.

HUBER,[1] WALTER,[2] LODER,[3] and HEROLD,[4] have also observed this abnormal origin of the inferior thyroid artery. I happened once to see it in the body of an adult man. It merits the attention of the surgeon in performing the operation of tracheotomy.

1 Act. Helvet. T. 8. p. 83.
2 l. c. Tab. 3. Fig. 2.
3 Programma, in quo recensentur non nullae arteriarum varietates. Jenae, 1781, p. 4.
4 l. c. p. 12.

FIGURE XII.

This represents the inferior thyroid artery arising from the arch of the aorta, between the left carotid and subclavian arteries, which I found in the body of a female of forty.

A. Aorta ascending to form the arch.
B. Arteria innominata.
1. Right subclavian artery.
2. Right carotid artery.
3. Left carotid artery.
4. Inferior thyroid artery.
5. Left subclavian artery.

C. Descending aorta.

The inferior thyroid artery which came off from the left subclavian was small, and gave no branches to the thyroid gland, but it sent off the transverse scapular and ascending cervical arteries.

NICOLAI* has also observed this unusual origin of the inferior thyroid artery.

* De Directione Vasorum, Argentorati, 1726, p. 25.

Fig. 1.

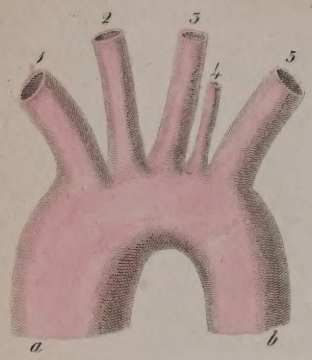


Fig. 2.

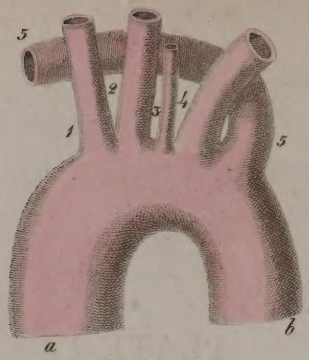


Fig. 3.

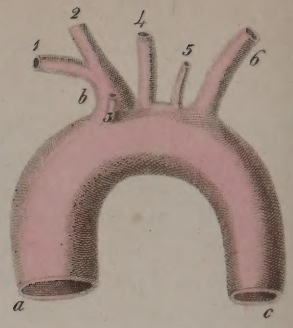
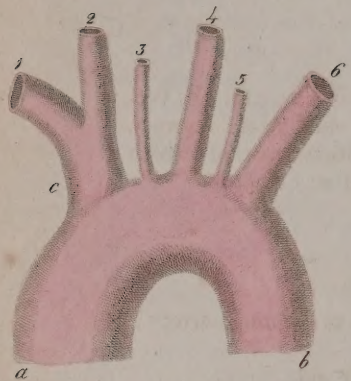


Fig. 4.



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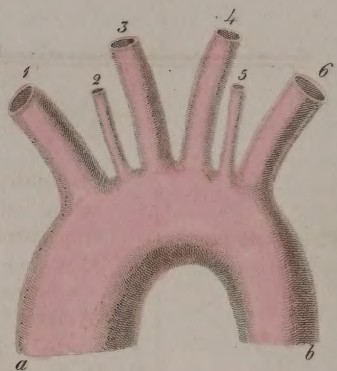

Fig. 6.

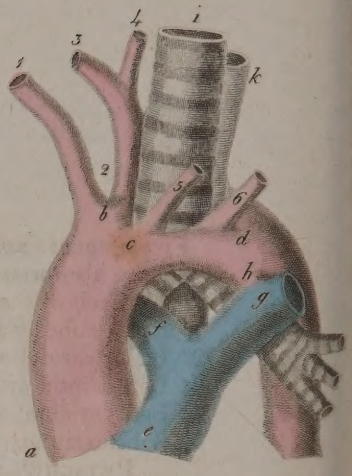

Fig. 7.

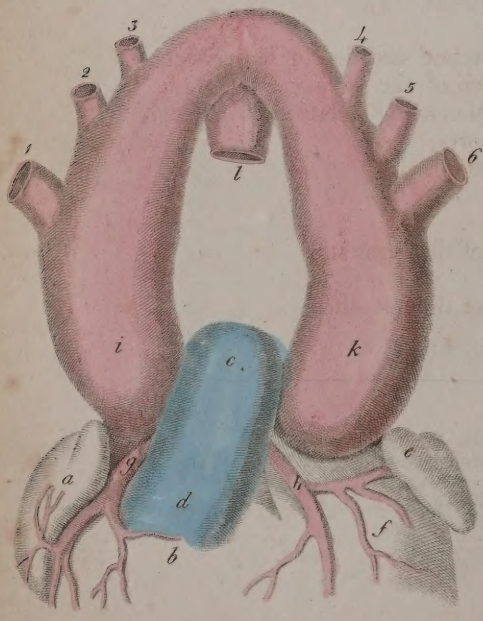

Fig. 8.

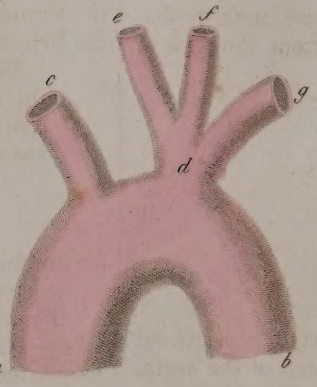

Fig. 9.

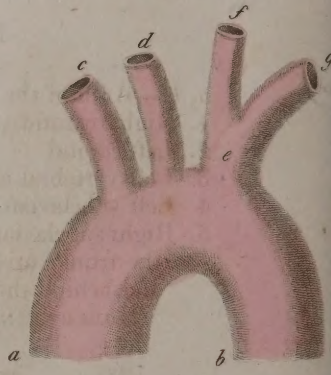

Fig. 10.

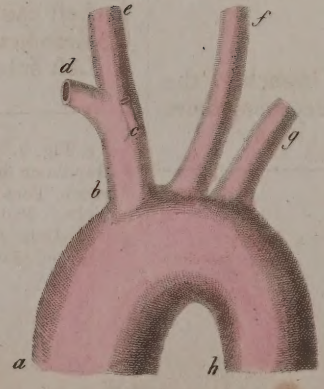

Fig. 11.

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PLATE IV

Figure I.

Five branches arising from the arch of the aorta have also been observed.

a, *b*.—Arch of the aorta.
1. Right subclavian artery
2. Right carotid artery.
3. Left carotid artery.
4. Left vertebral artery.
5. Subclavian artery of the left side.

Petsche[1] and Loder[2] saw such a disposition of branches arising from the arch of the aorta.

Figure II.

a, *b*.—Arch of the aorta.
1. Right carotid.
2. Left carotid
3. Left vertebral artery.
4. Left subclavian.
5. Right subclavian going to the right arm behind the trunks arising from the arch of the aorta, and behind the oesophagus and trachea.

Koberwein[3] has observed this variety.

Figure III.

In addition to the usual three branches, the right internal mammary artery sometimes originates from the arch of aorta, and the vertebral artery of the left side arises between the carotid and left subclavian, of which Boehmer[1] has delineated an example.

a, *c*.—Aorta.
b.—Arteria innominata.
1. Right subclavian.
2. Right carotid.
3. Right internal mammary, or thoracic artery
4. Left carotid.
5. Vertebral artery of the left side.
6. Left subclavian.

Sometimes instead of the right mammary, the inferior thyroid artery takes its origin from the arch of the aorta. J. F. Meckel[2] has observed this variety twice.

Figure IV.

Sometimes the vertebral arteries of both sides arise from the arch of the aorta. Penada,[3] Fiorati,[4] and Meckel,[5] relate such cases.

a, *b*.—Arch of the aorta.
c.—Arteria innominata.
1. Right subclavian.
2. Right carotid.
3. Vertebral artery of the right side.
4. Left carotid.
5. Vertebral artery of the left side.
6. Left subclavian.

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1 l. c. § 44. In a female body.
2 l. c.
3 l. c.

1 l. c. Fig. 2.
2 Handbuch der Anatomie, B. 3. S. 83.
3 Saggio Terzo di Osservazioni e memoire Pathologico-Anatomiche. Padoua, 1801, p. 44.
4 Attii Della Academia di Padoua, T. 3. P. 1. p. 38.
5 In Reils Archiv. B. 6. S. 571.

FIGURE V.

Six branches very rarely arise from the arch of aorta. I once happened to see them in the body of a man of forty.[1]

a, *b*.—Arch of the aorta.
1. Right subclavian.
2. Vertebral artery of the right side.
3. Right carotid.
4. Left carotid.
5. Vertebral artery of the left side.
6. Left subclavian.

FIGURE. VI.

This exhibits a very rare variety of the aorta observed by HOMMEL,[2] in which the aorta is seen divided at the commencement of the arch, and again united at its termination. Through this ring, as it were, the trachea and oesophagus pass.

a.—Trunk of the ascending aorta cut near the heart.
b.—Posterior arch.
c.—Anterior arch.
d—The reunion of both arches.
1. Right carotid artery.
2, 3, 4. Right subclavian artery.
5. Left carotid artery.
6. Left subclavian artery,
e.—Trunk of the pulmonary artery.
f.—Right branch of the pulmonary artery.
g.—Left branch of the pulmonary artery.
h.—The remains of the ductus arteriosus (Ligamentum arteriosum Botalli).
i.—The trachea.
k.—The oesophagus.

FIGURE VII.

This shows a remarkable aberration of the aorta described and delineated by VINC. MALACARNE.[3] The aorta had scarcely emerged from the left ventricle before it was divided into two trunks. Five semilunar valves were placed at the commencement of the aorta, which was very capacious. Each trunk, the right and left, gave off three branches to its own side, viz. the first the subclavian artery, the second the external carotid, and the third the internal carotid. After having given off these branches, the right and left arches joined together to form the descending or thoracic aorta.[1]

a.—Right auricle of the heart.
b.—Pulmonary ventricle.
c, *d*.—Pulmonary artery.
e.—Left auricle.
f.—Aortic ventricle.
g.—Right coronary artery of the heart.
h.—Left coronary artery.
i.—Right trunk of the aorta.
k.—Left trunk of the aorta.
l.—Aorta descendens.
1.—Subclavian artery of the right side.
2.—Right external carotid artery.
3.—Right internal carotid artery.
4.—Left internal carotid artery.
5.—Left external carotid artery.
6.—Subclavian artery of the left side

FIGURE VIII.

This shows a variety of the aorta which ZAGORSKY[2] has observed. The first trunk given off from the arch of the aorta directed its course to the right extremity only, but the second forming an anomalous trunk, divided into the two carotids and left subclavian.

a, *b*.—Arch of the aorta.
c.—Right subclavian artery.
d.—Anomalous trunk.
e.—Right carotid artery.
f.—Left carotid artery.
g.—Left subclavian artery.

FIGURE IX.

a. *b*.—Arch of the aorta.
c.—Right subclavian artery.
d.—Right carotid.
e.—Arteria innominata.
f.—Left carotid artery
g.—Left subclavian.

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1 Meckel relates a similar example which was observed by F Müller, (Handbuch der. Anat. B. 3. S. 84.

2 Commercium Litter. Norimberg, 1737. Hebdomas, 21. p. 161. Tab. 2. Fig. 1, 2.

3 Osservazioni in Chirurgia. Torino, 1784. P. 2. p. 119. Fig. 1. 2. From the body of a robust man of sixty, who died of apoplexy.

1 This disposition of the aorta is not unlike that which occurs in Amphybia, lizards, tortoises, serpents and frogs.

2 Mem. de l'Acad. des Sciences de St. Petersbourg, 1809. T. 1. p. 384.

In a body dissected by BERNHARD,[1] the aorta having arisen from the left ventricle, first ascended in a straight direction as far as the region of the third or fourth dorsal vertebra; it was then inclined towards the right, so that it was bent over the right branch of the trachea, and in this manner turned its arch to the right side: it then descended behind the right branch of the trachea, on the right side of the bodies of the vertebrae. By this singular direction, the origin of the larger vessels coming from the arch of the aorta was also changed. Similar cases have been observed by CAILLOT,[2] J. F. MECKEL,[3] and others.

FIGURE X.

This represents the irregular origin of the right mammary artery from the arteria innominata, which NEUBAUER[4] and WALTER[5] have described.

a.—Aorta.
b.—Arteria innominata.
c.—The right internal mammary artery, a branch of the arteria innominata.
d.—Right subclavian.
e.—Right carotid.
f.—Carotid of the left side.
g.—Subclavian of the same side.
h.—Thoracic aorta cut.

FIGURE XI.

This exhibits the inferior thyroid artery in the body of a boy, coming off from the arteria innominata. This variety which frequently occurs, was seen by HALLER,[6] NEUBAUER,[7] HUBER,[8] LODER,[9] and SOEMMERRING.[10] I have observed it four times, in the body of a new born infant, in a boy three years old, also in the bodies of two men, the one of twenty the other of sixty years. The inferior thyroid branches arising from the subclavian are generally seen to be small or wanting altogether. I once saw in the body of a man of fifty the inferior thyroid artery arising from the arteria innominata, and a small thyroid artery from the common carotid of the right side.

a.—Superior part of the sternum.
b, b.—The clavicles.
c, c.—The sternal portions of the sterno-mastoid muscles.
d, d.—Clavicular portions of the same muscles.
e, e.—The sterno-cleido-mastoidei muscles dissected.
f, f—The sterno-hyoid muscles.
g, g.—The sterno-thyroid muscles.
h, h.—The omo-hyoid muscles.
i.—The thyroid gland.
k.—Trachea.
l.—Common trunk of the right subclavian and carotid arteries.
m.—The inferior thyroid artery sending small branches to the thyroid gland.
n.—Left carotid.

Sometimes the inferior thyroid artery arises from the common carotid itself, which generally does not give off any branches.

NICOLAI,[1] HALLER,[2] BOEHMER,[3] MECKEL,[4] HUBER,[5] NEUBAUER,[6] and J. F. MECKEL[7] have observed this variety. I have noticed it twice.

Lastly, it may be mentioned here that it it is not uncommon for small arteries to arise from the arteria innominata, or from the anterior part of the arch of the aorta, which are distributed to the thymus gland and pericardium, or to the sterno-hyoid and thyroid muscles, or to the bronchia. RUYSCH, HALLER,[8] J. F. MECKEL,[9] NEUBAUER,[10] and others, have seen such arteries, and they have occurred to me several times.

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[1] De Arteriarum e corde prodeuntium aberrationibus. Berolini, 1818, 4 c. tab. aen. In the body of an infant which died a little after birth.
[2] Bulletin de l'Ecole de Medicine de Paris, 1807, p. 21.
[3] Pathol. Anat. B. 2. Abth. 1. S. 97.
[4] L. c. § 10. [5] L. c. Pl. 1.
[6] Icon. Anatomic, Fasc. 8. p. 60. Note 30.
[7] l. c. § 6. Tab. 6. He saw it thrice.
[8] l. c. T. 8. p. 83. He observed it several times.
[9] l. c. p. 4. Loder observed this variety twice; one example was in the body of an infant which died a short time after birth, another example was in the body of a woman about thirty years old.
[10] De Corporis Humani Fabrica, T. 5. p. 123. nota q.

[1] De Directione Vasorum, § 7. not. q. p. 28.
[2] Element. Physiol. T. 3. p. 403.
[3] Diss. de Confluxu Trium Cavarum in dextro Cordis atrio; resp. Nic. Theune. Hal. 1763.
[4] Epistol. ad Hallerum, vol. II. p. 258. The inferior thyroid artery arose from the left carotid.
[5] l. c. p. 84. Huber saw thisanomaly once in the left side, and thrice in the right.
[6] l. c. § 7. He observed the inferior thyroid artery arise from the trunk of the right carotid in the body of an adult, as well as in that of a new born child.
[7] Tabul. Anatom. Patholog. Fasc.2. T. 10. Fig. 3.
[8] Icon. Anat. Fasc. 3. p. 25. Fasc. 6. p. 3.
[9] Epist. ad Haller. T. 3. p. 80.
[10] l. c. § 9.

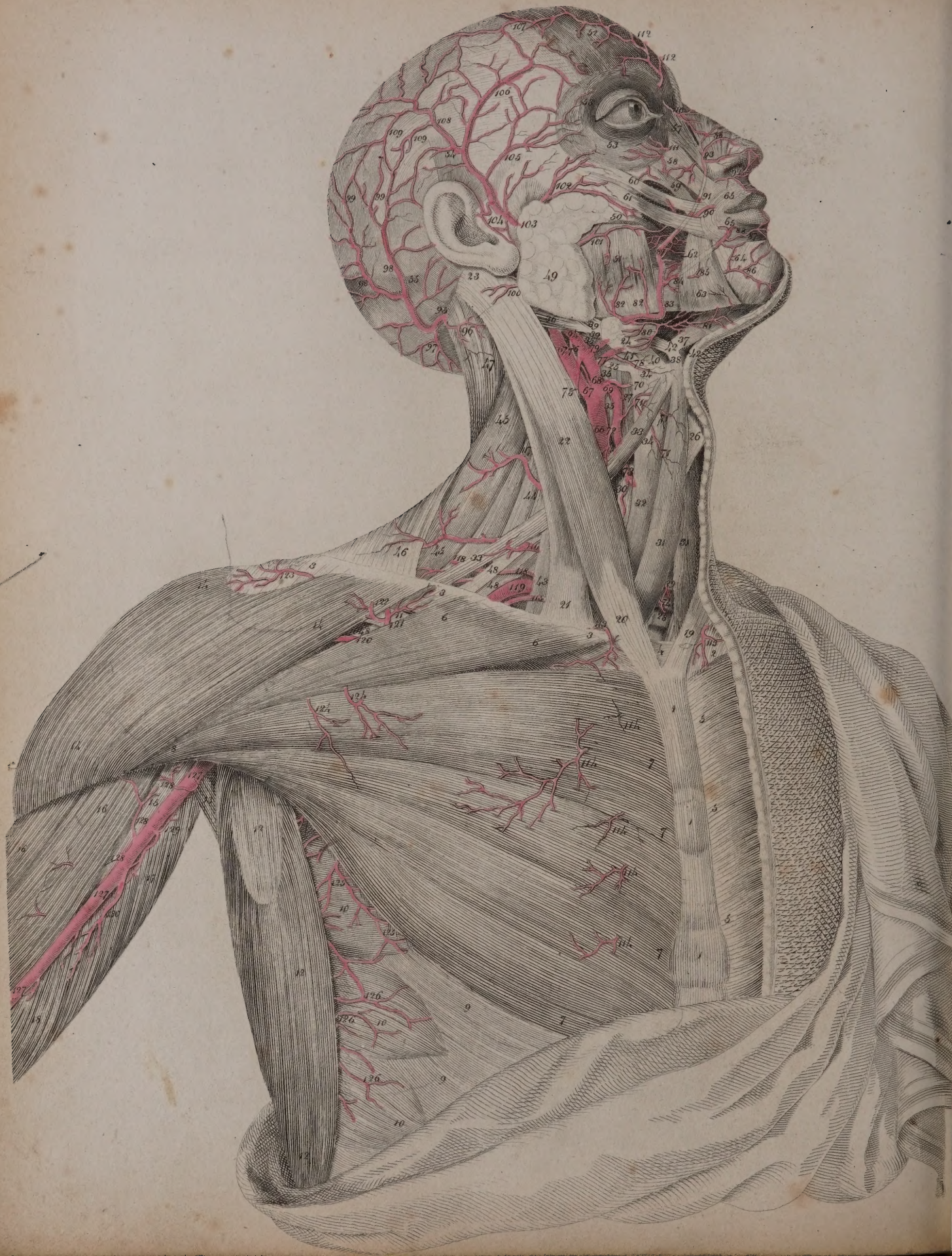

PLATE V.

Exhibits the Arteries of the Thorax, Neck, and Head, seen on removing the Platysma Myoides Muscle.

1, 1, 1. Sternum
2. Left clavicle.
3, 3, 3. Right clavicle.
4. Interclavicular ligament.
5, 5, 5. Pectoralis major of the left side.
6, 6. Clavicular portion of the pectoralis major of the right side.
7, 7, 7, 7. Portions of the pectoralis major, arising from the sternum and costal cartilages.
8. Insertion of the pectoralis major.
9, 9. Superior digitations of the external oblique muscle of the abdomen.
10, 10, 10. Serratus magnus muscle.
11. Part of the subclavius muscle.
12, 12, 12. Latissimus dorsi.
13. Teres major muscle.
* Teres minor ——
14, 14, 14. Deltoid ——
15, Coraco-brachialis ——
16, 16. Biceps flexor cubiti.
17. Long head of the triceps extensor.
18. Short head ————————
19. Sternal portion of the left sterno-mastoid muscle.
20. Sternal portion of the right sterno-mastoid muscle.
21. Clavicular portion of the same muscle.
22. Middle part of the sterno-cleido-mastoid.
23. Insertion of the same muscle.
24. Submaxillary gland.
25. Os hyoides.
26. Thyroid cartilage.
27. Superior horn of the thyroid cartilage.
28, 29. Trachea.
30. Thyroid gland.
31, 31. Sterno-hyoid muscles.
32. Sterno-thyroid muscle.
33, 33. Omo-hyoid muscle.
34. Hyo-thyroid ——
35, 35, 35. Inferior constrictor muscle of the pharynx.
36. Posterior belly of the biventer maxillae.
37. Anterior belly of the same muscle.
38. Aponeurosis of the biventer muscle descending to the hyoid bone.
39, 39. Stylo-hyoid muscle, through a slit in which the tendon of the biventer maxillae passes.
40. Tendon of the stylo-hyoid inserted into the hyoid bone.
41. Hyo-glossus muscle.
42. Mylo-hyoideus ——
43. Anterior scalenus ——
44. Middle and posterior scaleni muscles.
45, 45. Levator scapulae.
46. Trapezius.
47. Splenius capitis.
48, 48, 48. Inferior cervical nerves proceeding to the brachial plexus.
49. Parotid gland.
50. Steno's duct.
51. Masseter muscle.
52. Frontalis ——
53, 53. Orbicularis palpebrarum.
54. Attollens auriculam.
55. Occipitalis muscle.
56. Compressor narium.
57. Levator labii superioris alaeque nasi.
58. Levator labii superioris.
59. Levator anguli oris.
60. Zygomaticus minor.
61. Zygomaticus major.
62. Buccinator muscle.
63. Depressor anguli oris.
64. Quadratus menti muscle.

65, 65. Orbicularis oris muscle.
66. Common carotid artery.
67, 67. Internal or cerebral carotid.
68. External or facial carotid.
69. Superior thyroid artery.
70. Internal laryngeal ——
71, 71, 71. Superficial laryngeal branch, sending twigs to the sterno-hyoid, sterno-thyroid, omo-hyoid, and hyo-thyroid muscles.
72. A small branch to the sterno-cleido-mastoid and omo-hyoid muscles.
73. Proper thyroid branch distributed to the thyroid gland.
74. Twigs of the inferior thyroid artery proceeding to the trachea.
75. Branch to the sterno-cleido-mastoid muscle.
76. Ascending pharyngeal artery.
77. Lingual artery.
78. Hyoid branch.
79. Anterior facial, labial, maxillary, or external angular artery.*
80. Branches to the submaxillary gland.
81. Submental artery.
82, 82. Twigs to the masseter muscle.
83. Superficial labial artery.
84. Coronary artery of the inferior lip.
85. Small branch to the depressor anguli oris.
86. Twigs to the quadratus menti and skin.
87. Small artery to the orbicularis oris.
88. Proper coronary branch of the inferior lip perforating the orbicularis oris.
89. Coronary artery of the superior lip, ascending in a winding manner, and transmitting branches to the buccinator.
90. Proper coronary branch.
91. Lateral nasal artery.
92. Small twig proceeding to the orbicularis oris and septum nasi.
93. Branch running to the wing, dorsum, and apex of the nose, and anastomosing with the dorsal artery of the nose from the opthalmic and infra-orbital.
94. Trunk of the external carotid artery ascending and covered by the digastric muscle of the inferior jaw.
95. Occipital artery.
96. A branch running to the muscles of the neck.
97. Another twig proceeding downwards to the neck.
98. 98. Ascending and superficial occipital branches.
99, 99. Small arteries inosculating with the posterior auricular and temporal arteries.
100. Posterior auricular artery, sending a twig to the sterno-mastoid muscle.
101. Transverse artery of the face.
102. Branch to the orbicularis palpebrarum, zygomaticus major and minor muscles.
103. Superficial temporal artery.
104. Anterior auricular arteries.
105. Anterior temporal branch.
106. Middle temporal branch.
107. Twigs anastomosing with the frontal artery.
108. Posterior temporal branch.
109, 109. Small branches anastomosing with those of the occipital artery.
110. Dorsal artery of the nose from the opthalmic.
111. Branches of the infra-orbitar artery.
112, 112. Frontal artery.
113. Small branch of the internal mammary artery running between the sternal and clavicular portions of the sterno-cleido-mastoid muscle.
114, 114, 114, 114, 114. External perforating twigs of the internal mammary artery, distributed to the pectoralis major muscle, mamma, and skin.
115. Superior scapular or transverse scapular artery.
116. Superficial cervical artery.
117. Branch of the ascending cervical artery.
118, 118. Transverse artery of the neck.
119. Subclavian artery.
120. Arteria thoracica humeraria.
121. Acromial branch.
122. Cutaneous twig divided.
123. Small acromial branch.
124, 124. Branches of the thoracic artery perforating the great pectoral muscle, and proceeding to the mammary gland.
125, 125. Long thoracic artery.
126, 126, 126. Thoracic branches of the subscapular artery.
127, 127, 127. Trunk of the brachial artery.
128, 128, 128. Small branches to the biceps and coraco-brachialis muscles.
129. Small twig to the long head of the triceps.
130. Arteria profunda humeri.

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* The labial artery varies much in the size and distribution of its branches, as HALLER (l. c. Fasc. 3. p. 12. Fasc. 8. p. 12.) has correctly remarked. Sometimes it is so small that it does not even give off the superior coronary artery, at other times so large that all the arteries of the external parts of the nose, the palpebral arteries, nay even the frontal artery itself, are produced from it.

PL.VI.

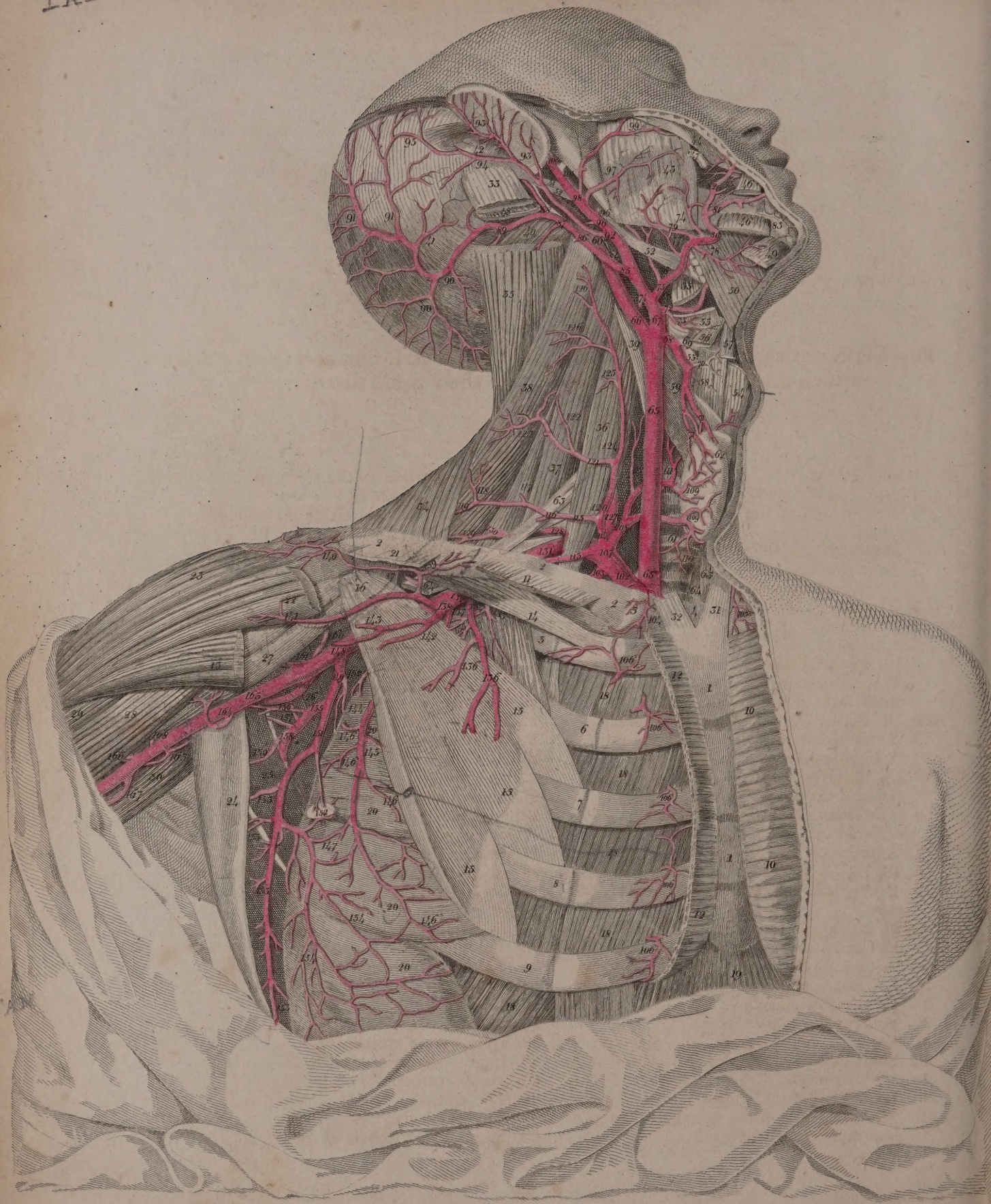

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PLATE VI.

This Plate represents the Carotid and Subclavian Arteries, and the Branches which arise from them, according to their usual distribution.

1, 1. Sternum.
2, 2, 2. Right clavicle.
3. Articulation of the clavicle with the sternum.
4. Interclavicular ligament.
5. First rib.
6. Second rib.
7. Third rib.
8. Fourth rib.
9. Fifth rib.
10, 10. Pectoralis major muscle of the left side.
11. Clavicular portion of the pectoralis major of the right side, cut away.
12, 12. Sternal portion of the same muscle.
13. Termination of the pectoralis major.
14. Subclavius muscle.
15, 15, 15. Origin of the pectoralis minor muscle from the 3d, 4th, and 5th ribs.
16. The insertion of the same muscle into the caracoid process.
17. Anterior common ligament of the scapula.
18, 18, 18, 18. Intercostal muscles.
19. Portion of the rectus muscle of the abdomen.
20, 20, 20, 20. Serratus magnus muscle.
21, 22. Clavicular portion of the deltoid muscle.
23. Deltoid muscle.
24. Latissimus dorsi thrown aside.
25. Teres major muscle.
26. Subscapular muscle.
27. Coraco brachialis.
28. Short head of the biceps.
29. Its long head.
30. Long head of the triceps.
31. Sternal portion of the sterno-cleido mastoideus muscle of the left side.
32. Sternal portion of the right sterno-cleido mastoideus removed.
33. Insertion of sterno-cleido mastoideus.
34 Trapezius.
35. Splenius capitis cut through.
36. Scalenus anticus.
37. Scalenus medius and posticus.
38. The levator scapulæ.
39. Rectis capitis anticus major muscle.
40. Obliquus capitis inferior.
41. Occipitalis muscle.
42. The retrahentes muscles of the ear.
43. The masseter muscle.
44. Zygomaticus major.
45. The buccinator.
46, 46. Depressor of the angle of the mouth cut through.
47. Steno's duct dissected back.
48. Origin of the digastric muscle of the lower jaw removed.
49. Insertion of the same muscle.
50. Mylo-hyoideus muscle.
51. Styloid process.
52, 52. Stylo-glossus muscle.
53, 53. Hyo-glossus muscle cut through.
* Sublingual gland.
54. Thyroid cartilage.
55. Upper horn of the same.
56. Omo-hyoid muscle cut.
57. Sterno-hyoid muscle laid back.
58. Hyo-thyroid muscle.
59. Inferior constrictor of the pharynx.
60. Middle constrictor of the pharynx.
61. The trachea.
62. Thyroid body.
63. Sterno-hyoid muscle of the left side.

64. Sterno-thyroid muscle of the left side.
65, 65. The common carotid artery.[a]
66, 66. The internal or cerebral carotid.
67. The external or facial carotid.
68. The superior thyroid artery.[b]
69. The superior laryngeal artery.[c]
70. Superficial branch which gives off twigs to the sterno-hyoid, omo-hyoid, and hyo-thyroid muscles.
71, 71. Thyroid branches.
72. Lingual artery.[d]
73. Hyoid branch.
74. A small branch, truncated, which proceeded to the sterno-cleido mastoid muscle.
75. Facial or external maxillary artery.
76. Ascending palatine artery.
77. Artery of the tonsil.
78. Sub-mental artery.
79. Branch sent to the masseter muscle.
80. Superficial labial artery.
81. Coronary artery of the lower lip.
82. Coronary artery of the upper lip.
83. A small branch of the inferior maxillary artery which passes through the mental foramen.

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[a] The common carotid artery sometimes divides much lower than the usual place opposite the horn of the hyoid bone. This unusual division occurs, at one time on both, at another only upon one side; sometimes on the right side, at the distance of not more than an inch from the arteria inominata; and sometimes in different places between this and the common point of separation. MORGAGNI (de Sed. et Causis Morborum, Lib. iii. Epist. 29. Art. 20.)—in a female subject, aged 50, observed the left common carotid artery divided into two branches, scarcely half an inch from its origin. BURNS, (l. c. p. 327.) and RYAN, (l. c. p. 4.) have seen a similar case.

[b] The superior thyroid artery sometimes arises from the common carotid artery—(BURNS, B. c. p. 329.—J. F. MECKEL, Patholog. Anat. b. ii. Abth. 1. p. 112.—BARCLAY, a Description of the Arteries of the Human Body, Edin. 1812, 8. p. 13.)—and sometimes forms a common trunk with the lingual artery, taking its origin either from the common carotid artery (BOYER,) or from the external carotid artery, (BURNS, l. c. p. 329.

[c] I have often seen the superior laryngeal artery coming off from the trunk of the external carotid. HALLER (Iconum. Anat. Fasc. ii. p. 4.) has observed this distribution five times.

It sometimes arises from the lingual artery, which I once happened to see in the body of a boy twelve years of age. It, for the most part, enters the larynx between the hyoid bone and thyroid cartilage, but seldom proceeds to the interior of it betwixt the thyroid and cricoid cartilage, as is represented by SABATIER, (Traité d'Anatomie, Paris 1781, 8. t. 3. p. 15.) and MURRAY, (Descriptio Arter. Corp. Hum. in Tab. Redacta, Lips. 1794. p. 11;) or through the opening in the thyroid cartilage.—(SÖMMERING, l. c. p. 126.)

[d] The lingual artery sometimes forms a common trunk with the labial or external maxillary. I have seen this variety ten times. HALLER (b. c. p. 5,) in seven out of 50 subjects, observed the lingual to arise in common with the labial. BURNS (b. c. p. 330.) asserts that he has seen a similar arrangement.

84. The ascending pharyngeal artery.[e]
85. The occipital artery.[f]
86. A small branch to the sterno-cleido mastoid muscle, cut.
87. A small branch to the splenius capitis muscle.
88. Stylo-mastoid artery.
89. A deep branch going to the trachelo-mastoideus, complexus, and splenius colli muscles.
90, 90. Superficial branches descending to the neck.
91, 91. Proper occipital branches ascending in a serpentine course.
92. Posterior auricular artery.[g]
93. Small twigs to the posterior surface of the external ear.
94. An occipital branch.
95, 95. Small branches inosculating with twigs from the occipital artery.
96, 96. Branches of the parotid gland cut.
97. Transverse artery of the face.[h]
98, 99. A branch sent to the orbicularis palpebrarum, and zygomatic muscles.
100. Superficial temporal artery.
101. Internal maxillary artery.
102. The trunk of the subclavian artery.
103. Internal mammary artery.
104. A small branch of the same artery which runs around the clavicle to the pectoralis major muscle, between portions of the sterno-cleido mastoid muscle.
105. The corresponding small branch of the left side.
106, 106, 106, 106. The external branches of the internal mammary artery, perforating the intercostal muscles.

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[e] The ascending pharyngeal artery usually takes its origin either from the external carotid, or at the point where the common carotid divides. I have, however, repeatedly seen it arise from the occipital and superior thyroid. HALLER (l. c. p. 4.) has likewise observed the same arrangement. Sometimes there are two pharyngeal arteries present; one of these branching off from the above-mentioned angle; another immediately below or above the lingual, forms the second or third branch of the external carotid.

[f] I have twice seen the occipital artery proceeding from the internal carotid. HALLER gives an account of a similar case, (l. c. p. 2.)

[g] The posterior auricular artery frequently arises from the occipital, as HALLER has correctly observed, (l. c. p. 8.)

[h] The distribution of the transverse artery of the face is so irregular, that, in the same head, it is seldom alike on both sides. Sometimes it is so large that it sends the whole of the small branches to the upper lip and nose, which commonly are given off by the facial.—(Vide HALLER, Icon. Anat. Fasc. 3, p. 12. Tabula Arteriarum faciei, ubi Arteriam Caronariam labii superioris, emittit.) Sometimes, also, it is so small that it only enters the orbicularis palpebrarum.

107. The inferior thyroid axis giving off the inferior thyroid, supra-scapular superficial, and ascending cervical arteries.
108. Inferior thyroid artery.[a]
109, 109. Branches proceeding to the thyroid body.
110. A small branch sent to the trachea.
111. The inferior or ascending laryngeal artery.
112. A small branch to the longus colli muscle.
113. Supra-scapular artery.[b]
114. The small trunk of the superficial and ascending cervical.
115. Superficial cervical artery.
116. A small branch to the omo-hyoid muscle cut.
117, 118. Small twigs proceeding to the levator scapulae.
119. A small branch to the trapezius.
120. Ascending cervical artery.
121, 122, 123. Branches running into the levator scapulæ.
124, 125. Small branches to the scaleni muscles.
126. Small branches to the levator scapulæ and muscles of the neck.
127. The vertebral artery.
128. Transverse artery of the neck, or dorsal artery of the scapula.[c]
129. A branch running to the trapezius.
130. The trunk of the transverse artery of the neck dipping under the levator muscle of the scapula.
131. The subclavian artery, which, after escaping from between the clavicle and first rib, assumes the name of the axillary artery.
132. The axillary artery.
133. A small branch to the serratus magnus anticus, and first rib.
134. The short thoracic.
135. A twig sent to the lesser pectoral muscle.
136, 136. Branches to the pectoralis major muscle truncated.
137. A small twig to the serratus magnus anticus.
138. Humeral, or acromial thoracic artery.
139. A clavicular twig.
140. An acromial branch.
141. Small branch going to the deltoid muscle.
142, 143. Minute branches to the greater pectoral muscle cut.
144. The long thoracic.
145. Small branch to the pectoralis minor muscle.
146, 146, 146, 146. Small branches to the serratus magnus muscle.
147. A slender twig inosculating with the thoracic artery, which is given off from the subscapular artery.
148. The axillary artery descending between the pectoralis minor, and subscapularis muscles.
149. Subscapular artery.
150. Branch to the subscapular muscle.
151. Thoracic branch.
152. A slender twig to the axillary lymphatic glands.
153, 153, 153, 153. Branches which are sent to the latissimus dorsi muscle.
154, 154, 154. Small branches to the lower portions of the serratus magnus.
155. Circumflex artery of the scapula.
156. A slender twig to the teres major muscle.
157. Branches to the subscapular and teres minor muscles, and long head of the triceps.
158. Proper circumflex branch.
159. Small branch to the latissimus dorsi.
160. A slender twig to the coraco-brachialis muscle.
161. Anterior circumflex artery of the humerus.
162. Posterior circumflex artery of the humerus.[d]
163. Humeral or brachial artery.
164. Branch to the coraco-brachialis and biceps.
165. A small branch to the long head of the triceps.
166. Branch to the biceps.
167. The superior profunda.
168. A small cutaneous branch cut.

[a] This artery sometimes originates from the common carotid itself; as has been observed by NICOLAI, (l. c. p. 28.;) HALLER, (Elem. Phys. T. iii. p. 403.;) VINK, (Van, de Bloed Vaten, p. 50.;) BÖHMER, (l. c. p. 81.;) NEUBAUER, (l. c. § 7.;) J. F. MECKEL, (Epist. ad Hallerum, T. ii. p. 258.;) HUBER, (Act. Helvet. T. viii. p. 84.;) J. F. MECKEL, (Grandson,) Tab. Anat. Pathol. Fasc. 2 T. x. Fig. 3.)

I have frequently observed this both in men and women. Some times two inferior thyroid arteries are present, either upon the right or left side, one of which arises as usual from the subclavian artery, and the other from the common carotid. BURNS once saw a pretty large artery, branching off from the subclavian, which ultimately separated into the inferior thyroid arteries of the right and left sides.

[b] This artery, for the most part, arises from the inferior thyroid, rarely from the subclavian itself. I once saw it given off from the internal mammary artery.

[c] The transverse artery of the neck, for the most part, takes its origin from the subclavian artery, seldom from the inferior thyroid.

[d] The circumflex arteries of the humerus not unfrequently either arise from, or form a common trunk with, the subscapular artery.

PL. VII.

Fig. 3.

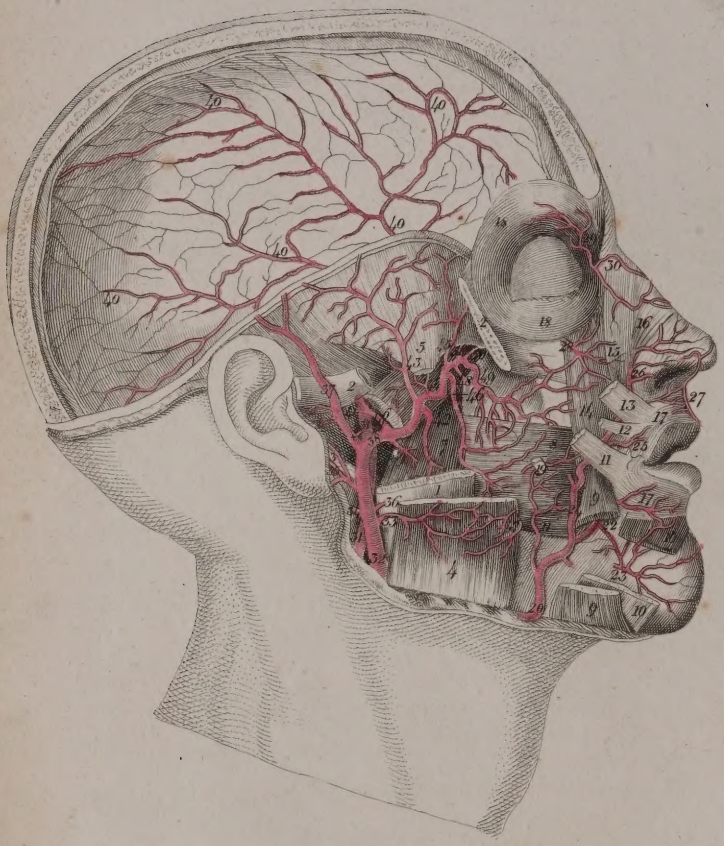


Fig. 2.

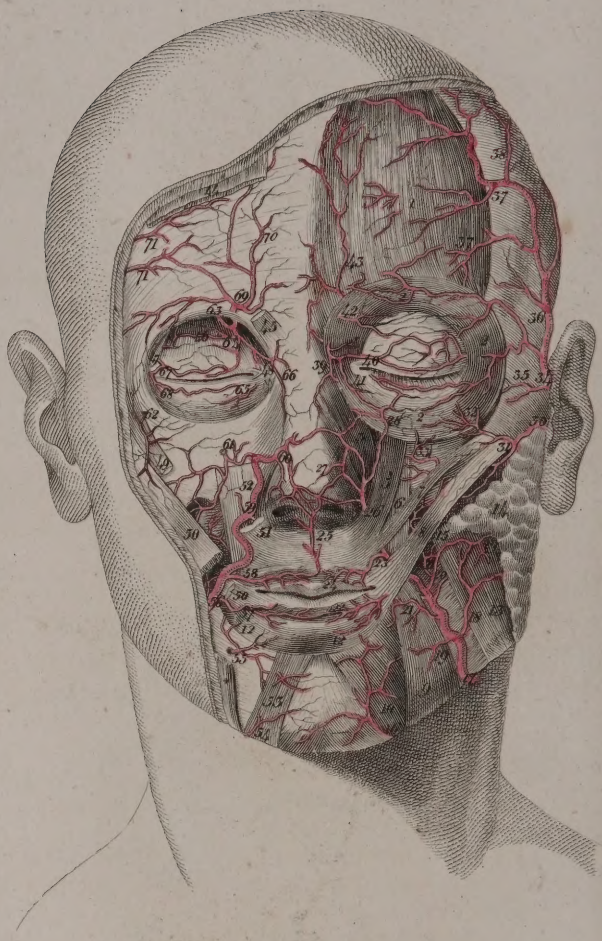


Fig. 1.

Fig. 5.

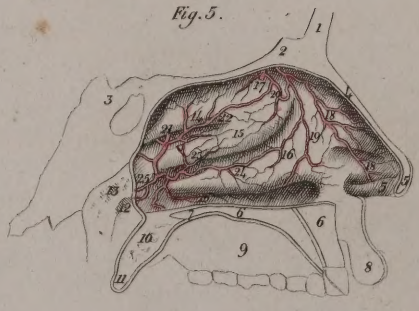
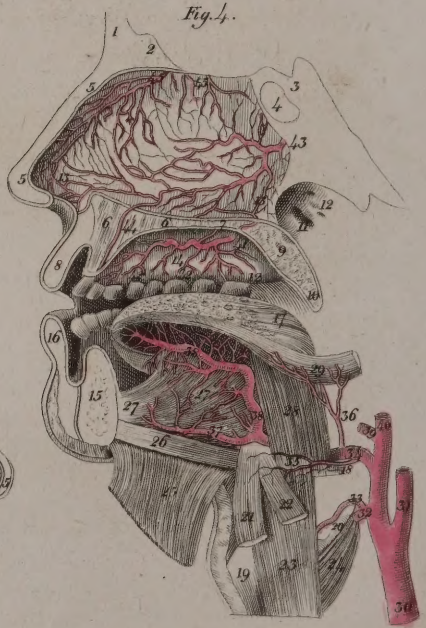


Fig. 4.



F. Mitchell sculpt

PLATE VII.

FIGURE I.

Exhibits a variety of the Superior Thyroid, and Lingual Arteries, which I observed in the body of a man who died of phthisis pulmonalis.

1, 1. Sterno-cleido-mastoideus muscle.
2. The hyoid bone.
3. Thyroid cartilage.
4. Thyroid body.
5. Omo-hyoid muscle.
6. Sterno-hyoid muscle.
7. Sterno-thyroid muscle cut.
8. Hyo-thyroid muscle.
9. Ascending horn of the thyroid cartilage.
10. Primitive carotid.
11. Internal carotid.
12. External carotid.
13. Superior thyroid artery.
14. Dorsal artery of the tongue.
15. Thyroid branches.
16. The other superior thyroid artery, from which are given off the laryngeal and lingual arteries.*
17. Superior laryngeal artery.
18. Lingual artery.
19. A small twig to the sterno-cleido-mastoid muscle.
20. Branches running to the thyroid body.

FIGURE II.

Represents the regular distribution of the Arteries of the Face.

1. The frontalis muscle.
2, 2, 2. The orbicularis palpebrarum.
3. Levator labii superioris, alaeque nasi.
4. The compressor muscle of the nose.
5. Levator proprius of the upper lip.
6. Levator of the angle of the mouth.
7. Zygomaticus minor.
8. Zygomaticus major.
9. Depressor of the angle of the mouth.
10. Depressor of the lower lip, or quadratus menti muscle.
11. Buccinator.
12. Orbicular muscle of the mouth.
13. Masseter.
14. The parotid gland.
15. Steno's duct.
16. Small branch of the submental artery ascending to the chin.
17. Labial or external maxillary artery.
18. Slender twig to the masseter muscle.
19. Inosculation with the submental.
20. Small branch to the buccinator.
21. Small branch to the depressors of the angle of the mouth and lower lip.
22. Coronary artery of the lower lip.
23. Coronary artery of the upper lip.
24. Small twigs to the labial glands.
25. Branch to the septum of the nose.
26. Lateral nasal artery.
27. Small branches uniting with those of the right side, at the apex of the nose.
28. Slender branches to the lower eye-lid.
29. Small branch of the transverse artery of the face.
30. Transverse artery of the face.
31. Small branches from it to the zygomatic muscles.
32. Small branch to the lower eye-lid.
33. Small branches of the infra-orbital artery.
34. Superficial temporal artery.
35, 35. Small branches to the eye-lids.
36. Anterior temporal branch.

* The superior thyroid artery is frequently to be met with double.

37, 37. Small branches to the forehead.
38. A small ascending branch.
39. The dorsal artery of the nose from the ophthalmic.
40. A small cutaneous branch to the superior eye-lid.
41. Cutaneous twig to the lower eye-lid.
42. Small branch to the frontal artery sent to the skin of the superior eye-lid.
43. Frontal artery.
44. Right frontal muscle cut.
45. Portion of the corrugator supercilii.
46. Levator of the upper eye-lid.
47. Lachrymal gland.
48. Lachrymal sac with the lachrymal ducts.
49. Portion of the zygomaticus minor.
50, 50. Zygomaticus major cut through.
51. Insertion of the levator of the upper lip.
52. Levator of the angle of the mouth.
53. Portion of the quadratus muscle of the chin.
* Depressor of the angle of the mouth cut.
54. Small branch of the submental artery going to the chin.
55. Small branch of the inferior maxillary artery which escapes from the mental foramen, and inosculates with the sub-mental artery and coronary artery of the lower lip.
56. Labial or external maxillary artery.
57. Coronary artery of the lower lip.
58. Coronary artery of the upper lip.
59. Lateral nasal artery.
60. Small branch to the apex of the nose.
61. Infra-orbital artery passing out through the infra-orbital foramen, and uniting with the coronary artery of the upper lip, the lateral nasal, and transverse artery of the face.
62. Slender twig of the lachrymal artery perforating the zygomatic foramen.
63. Ophthalmic artery.
64. Superior palpebral artery.
65. Inferior palpebral artery.
66. Dorsal artery of the nose.
67. Branch of the lachrymal artery to the upper eye-lid.
68. Branch of the same artery to the lower eye-lid.
69. Supra-orbital artery.
70. Ascending branch.
71, 71. Small branches of the temporal artery.

Figure III.

Shows the course of the Internal Maxillary Artery.

1. The ramus of the lower jaw partly removed.
2, 2. Zygomatic arch cut through.
3. Styloid process.
4. Masseter muscle.
5. Temporal muscle.
6. External pterygoid muscle.
7. Internal pterygoid muscle.
8. Buccinator.
9, 9. Depressor of the angle of the mouth cut.
10, 10. Quadratus menti muscle cut through.
11. Part of the zygomaticus major.
12. Part of the zygomaticus minor.
13. Portion of the levator of the upper lip.
14. Levator of the angle of the mouth.
15. Levator labii superioris alaeque nasi.
16. Compressor of the nostrils.
17, 17. Orbicularis oris muscle.
18, 18. Orbicularis palpebrarum.
19, 19. Parotid duct, cut.
20. Labial or external maxillary artery.
21. Small branch to the buccinator.
22. Coronary artery of the lower lip.
23. Mental branch of the inferior maxillary artery.
24. Trunk of the labial or external maxillary artery ascending to the upper lip and nose.
25. Coronary artery of the upper lip.
26. Lateral nasal artery.
27. Small branch to the septum of the nose.
28. Infra-orbital artery.
29. Small branch of the frontal artery to the eye-brow.
30. Dorsal artery of the nose.
31, 31. Internal carotid.
32. External carotid.
33. Branch to the masseter muscle.
34. Posterior auricular artery.
35. Deep auricular artery, which often arises from the internal maxillary artery.
36. The branch of the parotid gland, truncated.
37. Superficial temporal artery.
* Transverse artery of the face, cut.
38. Internal maxillary artery.
39. Slender twig to the internal pterygoid muscle.
40, 40, 40, 40. Middle meningeal artery, which enters the cranium through the spinous hole of the sphenoid bone, and there sends off branches to the dura mater.
41. Tympanic artery, which enters the cavity of the tympanum through the glenoid fissure.
42. Inferior maxillary artery, which enters the dental canal of the lower jaw, after having given off a small branch to the internal pterygoid muscle.
43. The first or posterior deep temporal artery.
44. Small branch to the external pterygoid muscle.
45. Second or anterior deep temporal artery.
46. Buccal artery.

47. Small twig from the above artery to the masseter muscle.
48. Superior palatine artery descending to the pterygoid canal.
49. Alveolar artery.
50. Infra-orbital artery, which passes along the canal of that name to the face.
51. Posterior nasal artery, which enters the cavity of the nostrils between the palate bone and upper jaw.

Figure IV.

Gives a delineation of the Lingual Artery, the Descending Palatine, and the Arteries distributed upon the Septum of the Nostrils.

1. Frontal bone.
2. Crista galli of the ethmoid bone.
3. Sphenoid bone.
4. Sphenoidal sinus.
5, 5. The external nose cut.
6, 6. Upper jaw.
7. Palate bone.
8. Upper lip.
9. Soft palate, or velum pendulum.
10. Uvula.
11. Entrance to the Eustachian tube.
12. Orifices of several mucous follicles.
13. 13, 13. Septum of the nose.
14. Palate.
15. Lower jaw.
16. Under lip.
17. The tongue.
18. Posterior horn of the hyoid-bone.
19. Thyroid cartilage.
20. Posterior horn of the same cartilage.
21. Portion of the sterno-hyoid muscle.
22. Part of the omo-hyoid muscle.
23. Hyo-thyroid muscle.
24. Inferior constrictor of the pharynx.
25. Mylo-hyoideus reflected.
26. Genio-hyoideus muscle.
27, 27. Genio-hyo-glossus.
28. Hyo-glossus.
29. Stylo-glossus.
30. Common carotid artery.
31. Internal carotid.
32. Thyroid artery, cut.
33. Superior laryngeal artery.
34. Lingual artery.
35. Hyoidean branch.
36. Dorsal artery of the tongue.
37. Sublingual artery.
38. Ranine artery.
39. Labial, or external maxillary artery truncated.
40. External carotid artery, cut.
41. Superior or descending palatine artery, a branch from the internal maxillary.
42, 42. Small twigs to the gum.
43. Branch of the posterior nasal artery to the septum of the nostrils.
44. Small branch of the same artery, descending through the incisive canal to the palate.
45. 45. Ethmoidal arteries, which are from the ophthalmic, and inosculate with the posterior nasal artery.

Figure V.

Represents the Arteries ramified on the turbinated Bones and Meatuses of the Nose.

1. Frontal bone.
2. Part of the crista galli.
3. Sphenoid bone.
4. Nasal bone.
5, 5. Wing of the nose.
6, 6. Upper jaw.
7. Palate bone.
8. Upper lip.
9. Palate.
10. Soft palate, or velum pendulum.
11. Uvula.
12. Orifice of the Eustachian tube.
13. Mucous follicles.
14. Superior turbinated bone.
15. Middle turbinated bone.
16. Inferior turbinated bone.
17. Small branch of the ethmoidal artery to the septum, cut.
18, 18. Small branches of the ethmoidal artery, which proceed to the internal surface of the wing of the nostrils.
19. Small branch extending to the inferior turbinated bone.
20. Slender twig going to the middle turbinated bone.
21. Branch of the posterior nasal artery proceeding to the turbinated bones.
22. Small twig going to the upper turbinated bone.
23. Small branch to the middle turbinated bone.
24. Slender twig proceeding to the lower turbinated bone.
25. Small branch to the Eustachian tube.
26. Minute twig to the lower meatus of the nostrils.

Fig. 1.

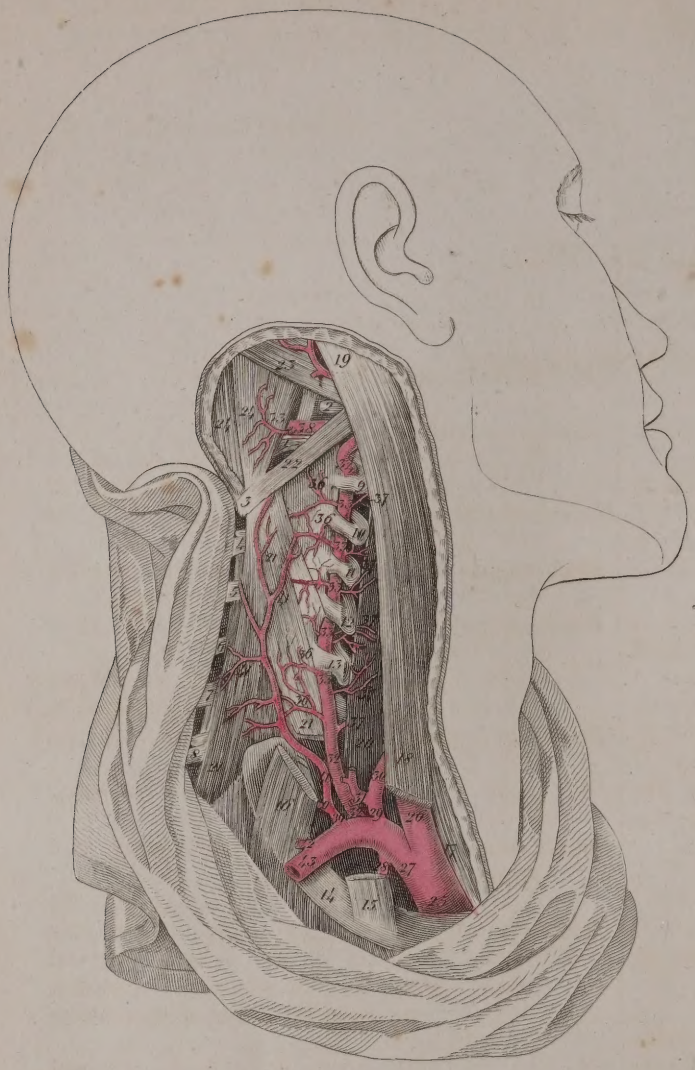


Fig. 2.

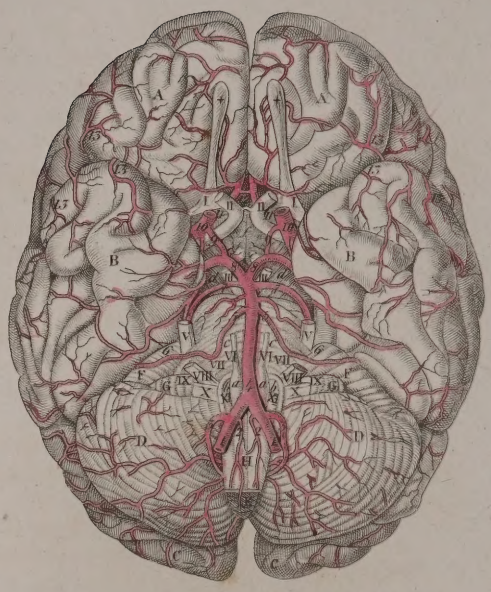


Fig. 3.

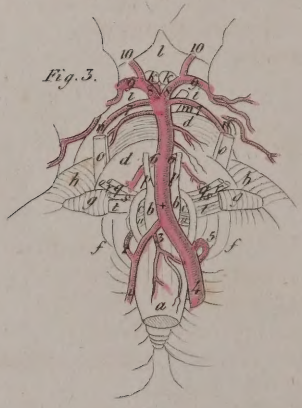


Fig. 4.

Fig. 5.

Fig. 6.

E. Mitchell sculp.

PLATE VIII.

Figure I.

Represents the Course of the Vertebral and deep Cervical Arteries.

1. Posterior arch of the atlas.
2. Transverse process of the same vertebra.
3. Spinous process of the second vertebra of the neck.
4, 5, 6, 7, 8. Spinous processes of the third, fourth, fifth, sixth, and seventh vertebrae of the neck.
9, 10, 11, 12, 13. Transverse processes of the second, third, fourth, fifth, and sixth vertebrae of the neck.
14. The first rib.
15. Insertion of the scalenus anticus muscle, cut.
16. The middle and posterior scaleni muscles, cut.
17. Sternal portion of the sterno-cleido-mastoid muscle.
18. Clavicular portion of the same muscle.
19. Insertion of the sterno-cleido-mastoid muscle.
20. The longus colli muscle.
21, 21, 21. Semi-spinalis colli.
22. Obliquus capitis inferior.
23. Obliquus capitis superior.
24. Rectus capitis posticus major.
25. Arteria innominata, or the common trunk of the right carotid and subclavian arteries.
26. The common carotid.
27. The subclavian artery.
28. Internal mammary artery.
29. Inferior thyroid axis.
30. Inferior thyroid artery.
31. The common trunk of the supra-scapular, superficial and ascending cervical, arteries.
32, 32. Vertebral artery.[a]
33. Vertebral artery proceeding upwards through the foramina in the transverse processes of the vertebrae of the neck.
34. The curve which this artery makes, from the point where it escapes from the hole in the transverse process of the second vertebra of the neck, till it arrives at the hole in the transverse process of the atlas.
35. The same artery proceeding to the foramen magnum between the atlas and occipital bone.
36, 36, 36, 36. Small branches to the deep muscles of the neck.
37, 37, 37, 37. Small branches to the longus colli, and rectus capitis anticus major muscles.
38. Twig to the posterior recti muscles of the head.
39. Trunk of the superior intercostal and deep cervical, arteries.[b]
40. Superior intercostal artery descending into the thorax.
41, 41, 41. The deep cervical artery which directs its course to the neck, between the transverse process of the seventh cervical vertebra and first rib, and, in its ascent, gives off small branches to the deep muscles of the neck.
42. The transverse artery of the neck, or dorsal artery of the scapula, truncated.
43. Subclavian artery.

[a] The vertebral artery sometimes enters the hole in the transverse process of the fifth, fourth, third, nay, even the second, but very rarely that of the seventh vertebra of the neck.

Figure II.

Exhibits the Arteries of the Base of the Brain.

A, A. The anterior lobes of the cerebrum.
B, B. The middle lobes.
C, C. The posterior lobes.
D, D. Hemispheres of the cerebellum.
E. Vermiform process, or inferior commissure of the cerebellum.
F, F. Lower surface of the anterior lobe of the cerebellum.
G, G. The lobules of the pneumo-gastric nerves.
H. Medulla spinalis, cut.

[b] These arteries sometimes arise separately from the subclavian artery.

a, *a*. The corpora pyramidalia.
b, *b*. The corpora olivaria.
c, *c*. The pons Varolii, or tuber annulare.
d, *d*. The crura cerebri.
e, *e*. Eminentiæ candicantes.
f. The infundibulum.
I, I. The olfactory nerves.
* * Olfactory bulbs.
II. II. Optic nerves.
III. III. The third pair, or common oculo-muscular nerves.
IV. IV. The fourth pair, or trochleares, or internal oculo-muscular nerves.
V. V. Fifth pair, or trifacial nerves.
VI. VI. Sixth pair, or external oculo-muscular nerves.
VII. VII. The facial nerves, or portiones duræ of the seventh pair.
VIII. VIII. The auditory nerves, or portiones molles of the seventh pair.
IX. IX. Glosso-pharyngeal nerves.
X. X. The pneumo-gastric nerves.
XI. XI. The ninth pair, or great hypoglossal nerves.
1, 1. The vertebral arteries.
2, 2. Anterior spinal arteries.
3, 3. Inferior and posterior cerebellar arteries from which the posterior spinal arteries arise.
4, 4. Basilar artery.
5, 5. The inferior and anterior arteries of the cerebellum.
6, 6. Arteries of the internal ear truncated.
7, 7. Superior cerebellar arteries.
8, 8. Deep or posterior cerebral arteries.
9, 9. The communicating arteries.
10, 10. Internal carotid arteries.
11, 11. Anterior cerebral arteries, or arteries of the corpus callosum.
12. Communicating branch.
13, 13, 13, 13, 13, 13. Small branches to the fossa of Sylvius.

Figure III.

Shows a Variety which I observed in the Vertebral Arteries of an Adult Male.

a. Medulla spinalis.
b, *b*. Corpora pyramidalia.
c, *c*. Corpora olivaria.
d, *d*. Pons Varolii, or tuber annulare.
e. Inferior vermiform process of the cerebellum.
f, *f*. The cerebellum.
g, *g*. The lobules of the pneumo-gastric nerves.
h, *h*. Anterior lobules of the cerebellum.
i, *i*. Crura cerebri.
k, *k*. Eminentiæ candicantes.
l. Infundibulum.
m. Nerve of the third pair.
n, *n*. Fourth pair.
o, *o*. Fifth pair.
p, *p*. Sixth pair.
q, *q*. Facial nerves.
r, *r*. Auditory nerves.
s, *s*. Glosso-pharyngeal nerves.
t, *t*. Pneumo-gastric nerves.
u, *u*. Hypo-glossal nerves.
1. Right vertebral artery, which is seen unusually small.
2. Inferior and posterior cerebellar artery of the right side.
3. Trunk of the anterior arteries of the medulla spinalis.
4. Left vertebral artery, remarkably large.
5. The left inferior and posterior cerebellar artery, larger than that of the right side.
* Basilar artery.
6, 6. The inferior and anterior cerebellar arteries, differing in magnitude, the right being larger than the left.
7, 7. Superior cerebellar arteries.
8, 8, 9, 9. Deep cerebral arteries.
10, 10. The Branches communicating with the internal carotid arteries.

Figure IV.

Represents the Superior Branches of the left Ophthalmic Artery.

a, *a*. Orbicularis palpebrarum muscle.
b, *b*. Levator palpebrae superioris.
c. Rectus superior, or attolens oculum.
d. Rectus externus, or abductor oculi.
e. Rectus internus, or adductor oculi.
f. Superior oblique muscle of the eye.
g. Trochlea or pulley.
h. Tendon of the superior oblique passing through the trochlea.
i. The lachrymal gland.
k. The optic nerve.
1. The last turn of the internal carotid artery, from which is given off the ophthalmic artery.
2. Ophthalmic artery.
3. Lachrymal artery.
4. Twig proceeding to the abductor oculi.
5. Slender branches going to the lachrymal gland.
6, 6. Palpebral or tarsal artery, anastomosing with the superior palpebral artery.
7. Trunk of the ophthalmic artery crossing the optic nerve.
8. Posterior ethmoideal artery.
9. Anterior ethmoideal artery.

10. Supra-orbital artery.
11. Small branch to the levator palpebrae superioris.
12. Ophthalmic artery proceeding to the inner canthus of the eye.
13. Dorsal artery of the nose.
14. Frontal artery.
15. Superior palpebral artery.
16. Inferior palpebral artery.

Figure V.

Shows the deep Branches of the Ophthalmic Artery.

a. Ball of the eye.
b. The attollens oculum, cut and reflected.
c. Insertion of the same muscle.
d. Abductor oculi.
e. Depressor oculi.
f. Superior oblique muscle.
g. Trochlea.
h. Tendon of the superior oblique.
i. The optic nerve.
1. The flexure of the internal carotid.
2. Ophthalmic artery.
3. Central artery of the retina.
* Slender twig going to the attollens oculum, cut.
4. Small branch to the same muscle and levator palpebrae superioris.
5. Lachrymal artery cut.
6. Inferior muscular artery.
** Ciliary arteries.
7. Trunk of the ophthalmic artery going across the optic nerve.
* Posterior ethmoideal artery.
8. Small branch to the superior oblique muscle, as also the anterior ethmoideal artery.
9. Ciliary arteries.
10. Supra-orbital artery.
11. Continuation of the artery, cut.

Figure VI.

Exhibits the internal Mammary and Superior Intercostal Arteries, as they occurred in the body of a full grown man.

1. Seventh vertebra of the neck.
2, 3, 4, 5, 6. The upper dorsal vertebrae.
7, 7. First Rib.
8, 8, 8. Second rib.
9, 9, 9. Third rib.
10, 10. Fourth rib.
** The sternum.
11. The clavicle.
12, 13, 14. Costal cartilages.
15. Subclavian artery.
16. Vertebral artery.
17. Internal mammary artery.[a]
18. Small branch which proceeds around the clavicle from the cavity of the thorax.
19, 19. Sternal branches.
20, 20, 20. Sternal branches of the left side cut, which inosculate with the former.
21, 21. Intercostal branches.
22, 22, 22. External thoracic branches which perforate the intercostal muscles.
23, 23, 23. Intercostal branches which anastomose with the proper intercostal arteries.
24. Trunk of the deep cervical and first intercostal arteries arising from the subclavian.[b]
25. Deep cervical artery.
26. Superior intercostal artery crossing the first rib.
27, 27. Dorsal branches which perforate the intercostal muscles and proceed to the muscles of the back.
28. First intercostal artery.
29, 29. Superior and inferior branches.
30. Second intercostal artery.
31, 31, 31, 31. Superior and inferior branches.
32. Third intercostal artery arising from the aorta.
33. Dorsal branch of the same artery.
34. Proper intercostal branch.
35. Fourth intercostal artery.
36. Dorsal branch.
37. Intercostal branch.

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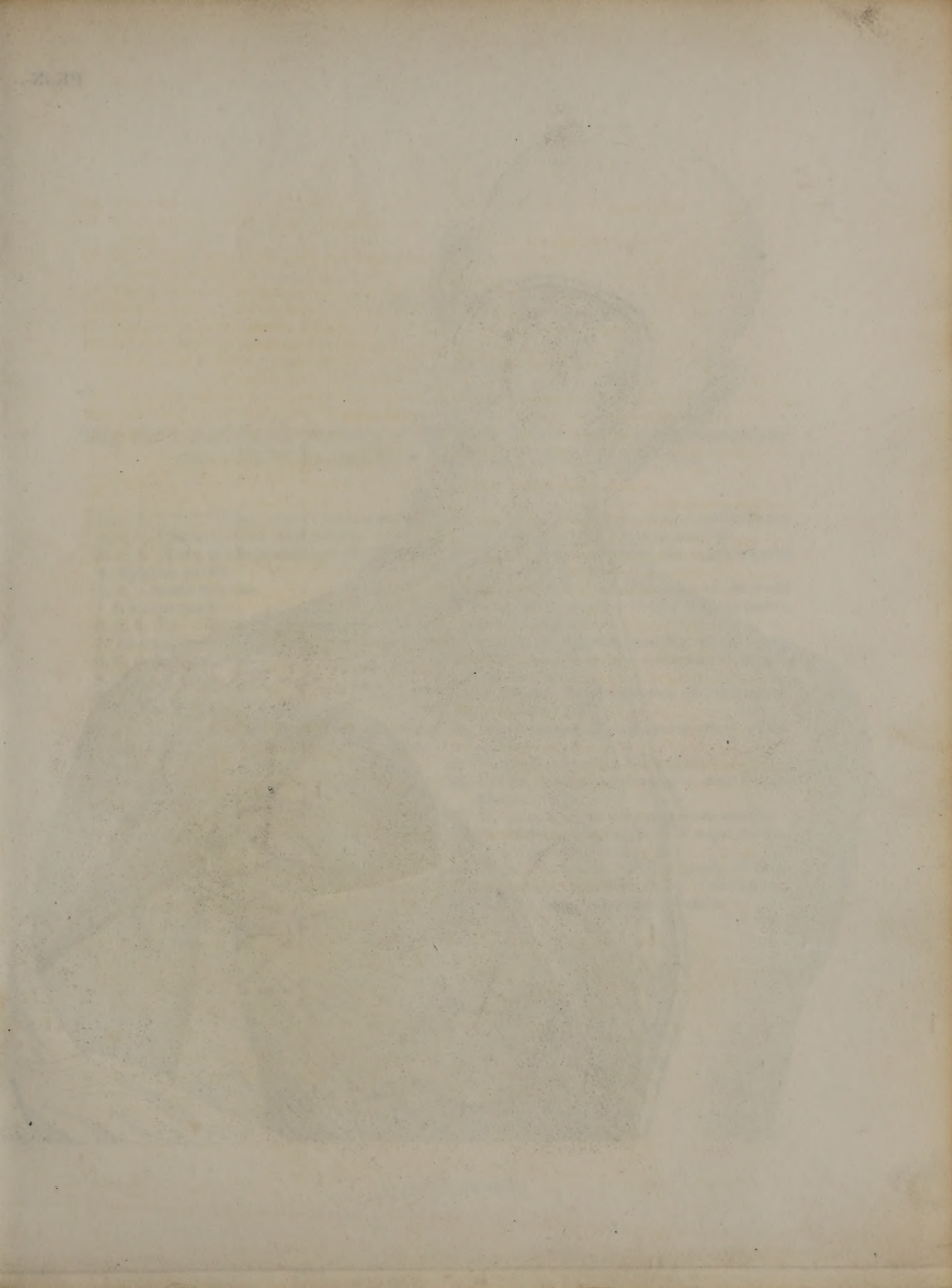
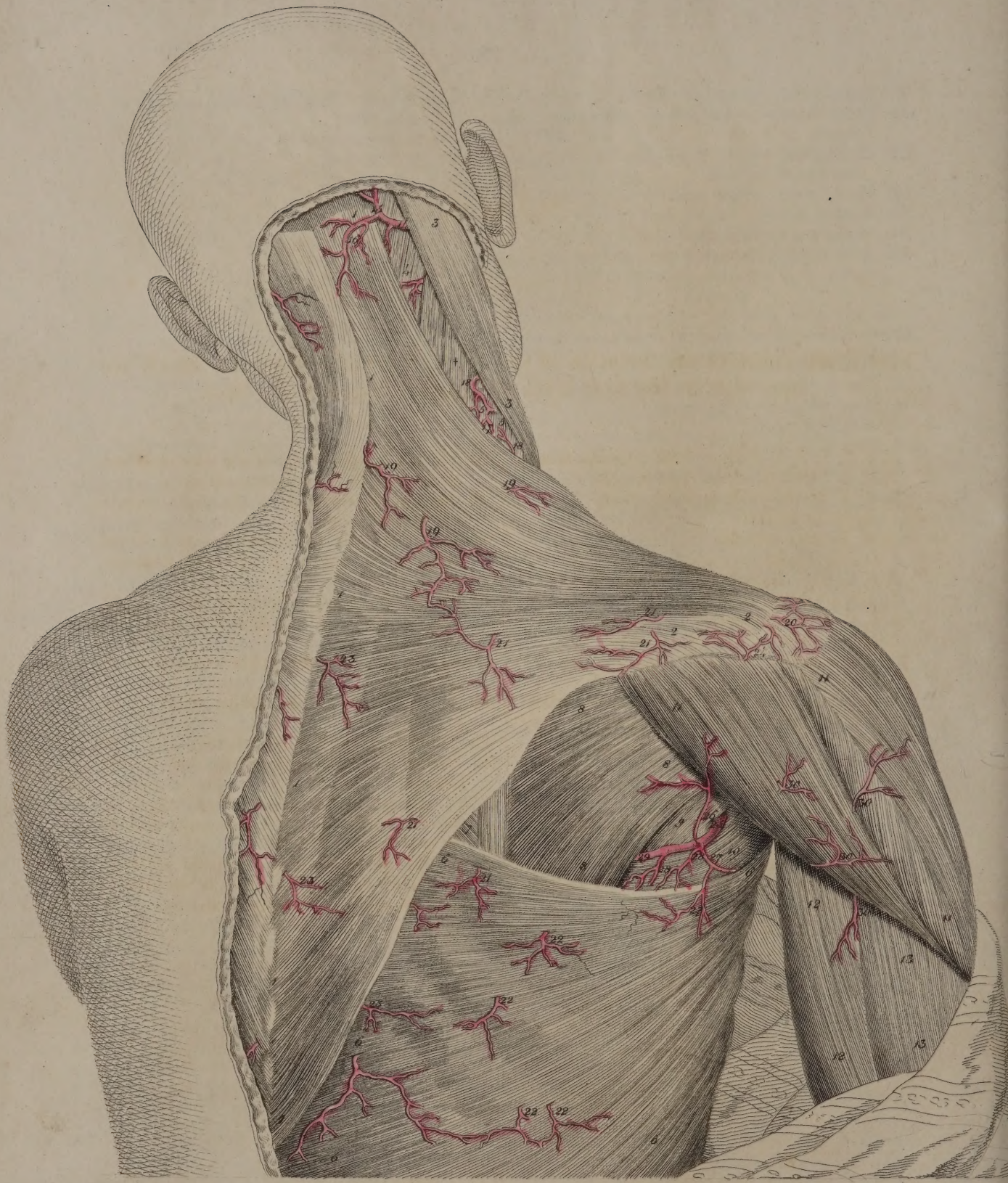
a The origin of this artery is sufficiently uniform, for it very rarely arises either from the arch of the aorta, or the arteria innominata. J. J. Huber, (Act. Helv. T. 8. p. 92.) once saw it given off from the inferior thyroid artery. I have twice observed a similar origin.

b They often arise separately from the subclavian artery.





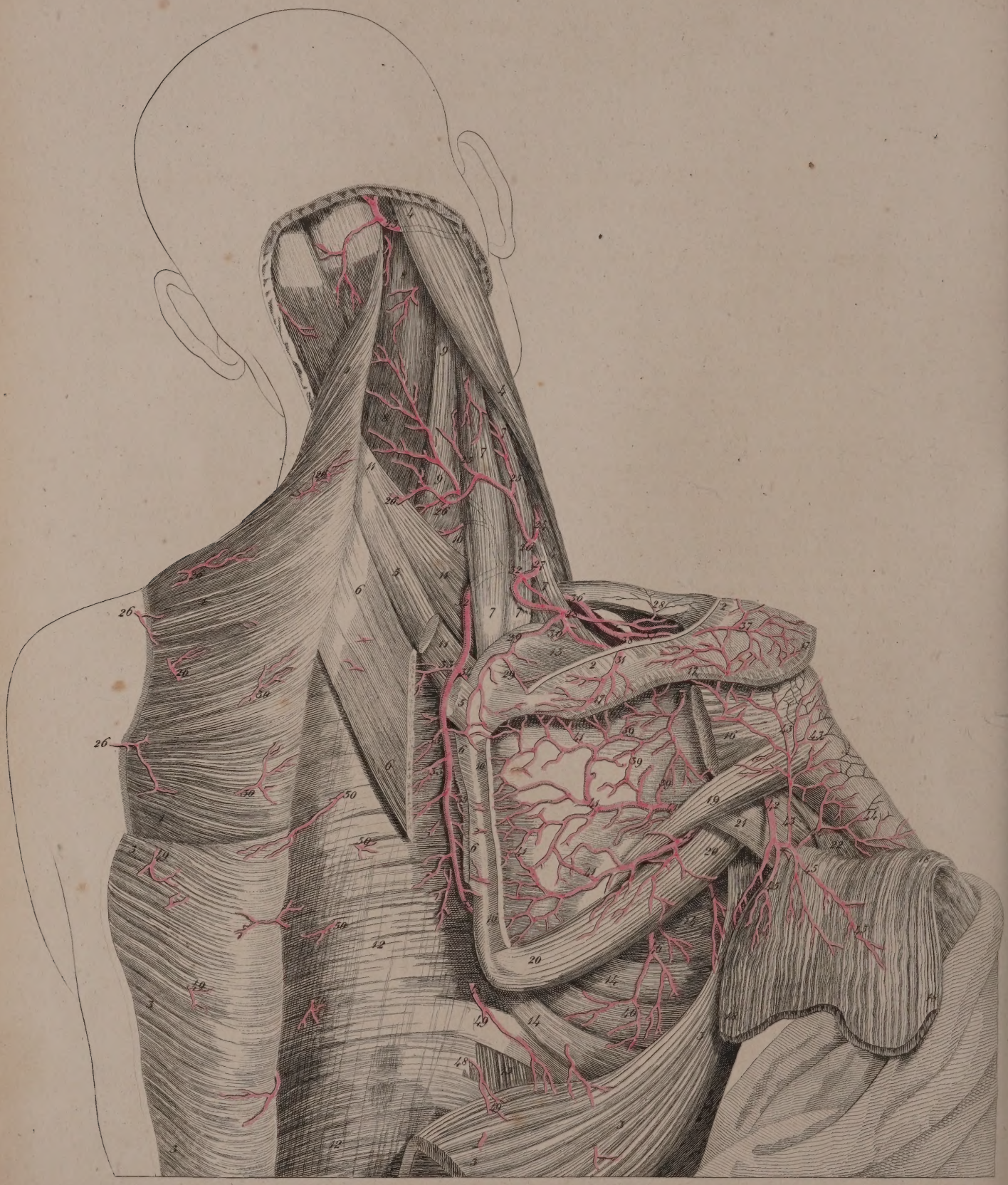
E.Mitchell Sculp.t

PLATE IX.

This Plate exhibits the Arteries of the Neck, Back, and Scapula, which are met with in the first layer of Muscles beneath the Skin.

1, 1, 1, 1, 1, 1. Origin of the trapezius muscle.
2, 2, 2. Insertion of the same muscle.
3, 3, 3. Sterno-cleido-mastoid muscle.
4. Splenius capitis.
5, 5. Levator scapulæ.
* Scalenus posticus.
6, 6, 6, 6, 6. Latissimus dorsi muscle.
7. Rhomboideus major muscle.
8, 8, 8. Infra-spinatus.
9. Teres minor.
10. Teres major.
11, 11, 11. Deltoid.
12, 12. Long head of the triceps extensor cubiti.
13, 13. Second or external head of the same muscle.
14. Occipital artery.
15. Proper occipital branch.
16. Superficial cervical branch.
17. Small branch of the ascending cervical artery to the trapezius.
18, 18. Small branches of the same artery to the levator muscle of the scapula and scalenus posticus.
19, 19, 19. Slender twigs of the superficial cervical artery to the trapezius and skin.
20. Minute ramifications of the supra-scapular and acromial arteries.
21, 21, 21, 21, 21. Small branches of the dorsal artery of the scapula to the skin, trapezius, and latissimus dorsi.
22, 22, 22, 22. Minute branches of the intercostal arteries to the latissimus dorsi and skin.
23, 23, 23, 23. Dorsal branches of the intercostal arteries.
24. Branch of the supra-scapular artery to the acromion.
25. Circumflex artery of the scapula.
26. Branch to the infra-spinatus and deltoid muscles.
27, 27. Branch to the latissimus dorsi muscle.
28, 28. Small branches to the teres major muscle.
29. Deep circumflex branch.
30, 30, 30, 30. Small branches given off from the posterior circumflex artery of the humerus to the deltoid and triceps muscles.

PL. X.



E. Mitchell Sculp.t

PLATE X.

This plate represents the Ramifications of the Arteries distributed to the Muscles of the Neck, Back, and Scapula.

1, 1, 1. Trapezius cut through and reflected.
2, 2. Insertion of the same muscle.
3, 3, 3, 3, 3, 3. Latissimus dorsi divided and thrown aside.
4, 4. Sterno-cleido-mastoid muscle.
5, 5. Rhomboideus minor.
6, 6, 6, 6. Rhomboideus major cut through.
7, 7, 7, 7, 7. Levator Scapulæ.
8, 8. Splenius capitis.
9, 9. Splenius colli.
10. Transversalis colli.
11, 11, 11. Serratus posticus superior.
12, 12, 12. Vertebral aponeurosis binding down the long muscles of the back.
13. 13. External intercostal muscles.
14, 14, 14. Serratus magnus.
15. Supra spinatus.
16. Origin and insertion of the infra-spinatus.
17. Origin of the deltoid.
18, 18, 18. Deltoid divided at its origin, and drawn downwards.
19. Teres minor.
20. Teres major.
21. Long head of the triceps.
22. External or middle head of the triceps.
23. Occipital artery.
24. Superficial cervical artery.
25, 25. Small branches going to the levator muscle of the scapula and splenii muscles.
26, 26, 26, 26, 26. Slender branches distributed to the trapezius, cut.
27. Transverse artery of the neck, proceeding between the fasciculi of the levator of the scapula.
28, 28. A twig sent to the clavicle.
29, 29. Small branch to the supra-spinatus muscle.
30, 30, 30. Small branches distributed to the trapezius muscle.
31. Slender branch perforating the insertion of the trapezius, and crossing the spine of the scapula.
32, 32. Dorsal artery of the scapula.
33, 33, 33. Small branches which are sent to the rhomboideus major and serratus posticus superior muscles.
34. Branch descending under the scapula, and proceeding to the subscapularis muscle.
35, 35. Minute branches going to the subscapularis muscle.
36. Supra-scapular artery.
37, 37. Superficial scapular branch perforating the trapezius, and giving off twigs to the skin covering the upper part of the arm, and to the deltoid muscle. It anastomoses with the acromial artery.
38, 38. A branch descending through the great notch of the scapula to the fossa infra-spinata.
39, 39, 39. Small branches of the same artery which inosculate with the circumflex artery of the scapula.
40. Trunk of the subclavian artery.
41, 41, 41, 41, 41, 41. Branches of the circumflex artery of the scapula.
42. Posterior circumflex artery of the humerus.
43, 43, 43. Branches entering the infra-spinatus, teres minor, and articular capsule of the humerus.
44, 44. Slender branches to the periosteum of the humerus.
45, 45, 45. Small twigs going to the deltoid muscle.
46, 46. Branch of the long thoracic artery proceeding to the serratus magnus muscle.
47. Branch of the same artery sent into the latissimus dorsi muscle.
48, 49. Branches of the inter-costal arteries to the latissimus dorsi.
50. Dorsal Branches of the intercostal arteries.

PL. XI.

Fig. 1.

Fig. 2.

E. Mitchell sculpt.

PLATE XI.

This exhibits, according to their regular order, the Arteries of the Anterior Aspect of the Superior Extremity, Right Side.

FIGURE I.

In this Figure are seen the Arteries which are situated beneath the Skin, and Aponeurosis of the Upper Extremity.

1. Insertion of the latissimus dorsi muscle.
* Termination of the pectoralis major.
2. The deltoid muscle.
3. Coraco-brachialis.
4. Long head of the triceps.
5. Short head of the same muscle.
6. Internal intermuscular ligament.
7, 7. Biceps flexor cubiti.
8. Aponeurosis of this muscle.
9. Brachialis internus.
10, 10. Pronator teres.
11, 11. Supinator radii longus.
12. Supinator brevis.
13. Extensor carpi radialis longior.
14. Extensor ossis metacarpi pollicis.
15. Extensor primi internodii pollicis.
16, 16, 16. Palmaris longus.
17. Palmar aponeurosis.
18, 18, 18. Flexor carpi radialis.
19, 19, 19. Flexor carpi ulnaris.
20, 20. Flexor communis digitorum sublimis *seu* perforatus.
21, 21, 21, 21, The tendons of this muscle.
22, 22. Flexor communis digitorum profundus *seu* perforans.
23, 23, Flexor longus pollicis.
24. Palmaris brevis.
25. Opponens pollicis.
26. Abductor pollicis.
27. Flexor brevis pollicis.
28. Adductor pollicis.
29. Abductor, or prior indicis.
30, 30, 30, 30. Lumbricales muscles.
31. Flexor brevis minimi digiti.
32. Abductor minimi digiti.
33. Fibrous sheath which binds down the tendons on the first phalanx of the fore-finger.
34. Crucial ligament of the first phalanx of the fore-finger.
35. Transverse ligament ————————
36. Fibrous sheath of the second phalanx.
37. Oblique ligament of the second phalanx of the same finger.
38. Annular ligament surrounding the articulation of the second and third phalanges.
39, 39. The brachial or humeral artery, proceeding from the cavity of the axilla.
40. A small branch to the triceps.
41, 41, 41. Small twigs to the coraco-brachialis and biceps.
42. Arteria profunda, or great collateral artery descending between the two lower heads of the triceps.
43, 43 Branches to the triceps.
44, 44. Ramus anastomoticus, or ulnar collateral artery.
45. A small branch to the brachialis internus.
46. A twig to the pronator teres, and flexor carpi radialis.
47. Radial recurrent artery.
48. 48, Radial artery.
49, 49, 49, 49, 49. Small branches to the supinator longus, extensor carpi radialis longior and brevior, likewise to the extensors, the abductor, and long flexor of the thumb.
50, 50, 50, 50. Twigs proceeding to the pronator teres, flexor carpi radialis, and the flexors of the fingers.
51, 51 Superfical volar artery.
52, 52. Twigs to the small muscles of the thumb.
53. Trunk of the radial artery passing to the back of the wrist.

54. A slender branch to the abductor, opponens, and flexor brevis pollicis.
55, 55, 55. Ulnar artery.
56. 56, 56. Twigs sent to the flexor carpi radialis, flexor carpi ulnaris, palmaris longus, and flexors of the fingers.
57. A small branch to the palmaris brevis.
58, 58, The ulnar artery in the palm of the hand, forming, with the superficialis volae of the radial artery, the superficial palmar arch.
59. Deep palmar artery.
60. First digital artery.
61. Second digital artery.
62. Third digital artery.
63. Fourth digital artery.
64. Twigs to the skin of the palm truncated.
65, 65, 65. Subdivision of the second, third, and fourth digital arteries.
The fourth digital artery divides into
66 The digito-ulnar artery of the fore-finger, and
67. The digito-radial artery of the middle finger.
The third digital artery divides into
68. The digito-ulnar artery of the middle finger and
69. The digito-radial artery of the ring-finger.
The second digital artery divides into
70. The digito-ulnar of the ring-finger, and
71. The digito-radial of the little finger.
72, 72, 72, 72, 72. 72, 72, 72, 72. Twigs which the digital arteries send to the back of the fingers.
73, 73, 73, 73. The digital arteries forming arches.
74, 74. Anterior digito-radial artery of the thumb arising from the arteria magna pollicis.
75. Anterior digito-ulnar artery of the thumb coming off from the same artery.
76, 76. Anterior digito-radial artery of the fore-finger

Figure II.

Shows the deep Arteries of the Superior Extremity.

1. Tendon of the latissimus dorsi.
2. Coraco-brachialis muscle.
3, 3. Long Head of the triceps.
4, 4. Short Head of the same muscle.
5, 5. Internal intermuscular ligament.
6, 6. Brachialis internus.
7. Tendon of the biceps.
8, 8. The pronator teres muscle cut at its origin.
9. Flexor carpi radialis and palmaris longus cut.
10. Supinator brevis.
11, 11. Extensor carpi radialis longior.
12, 12. Extensor carpi radialis brevior.
13. Tendon of the supinator longus.
14, 14. Part of the flexors of the fingers.
15, 15. Flexor longus pollicis.
16. Pronator quadratus.
17, 17. Interosseous ligament of the fore-arm.
18. Part of the tendon of the flexor carpi radialis.
19. Tendon of the flexor carpi ulnaris.
20, 20. Proper ligament of the carpus divided.
21. First external interosseous muscle.
22, 23, 24. Interossei muscles of the middle finger.
25. Adductor minimi digiti.
26. Abductor minimi digiti.
27, 27, 27. Brachial artery.
28. Branch to the triceps.
29. Branch to the coraco-brachialis.
30. Arteria profunda humeri.
31, 31, 31, 31, 31. Branches to the brachialis internus and triceps.
32. Ramus anastomoticus, or ulnar collateral artery.
33. Slender branch to the brachialis internus.
34. The division of the brachial artery into the radial and ulnar.
35. Radial artery.
36, 36, 36, 36. Ulnar artery.
37. Radial recurrent artery.
38. Small branch proceeding to the capsular membrane of the fore-arm.
39. Ulnar recurrent artery.
40, 40, 40, 40. Small branches given off from the radial artery to the muscles of the fore-arm.
41. A small branch to the pronator quadratus, inosculating with twigs of the anterior interosseal artery.
42. Anterior carpal branch, which, anastomosing with twigs of the ulnar and anterior interosseal arteries, forms a vascular net-work on the carpus.
43, 43. Superficial volar branch of the radial, truncated.
44 Radial artery proceeding towards the back of the hand.
45, 45. Interosseal artery.
46. Superior perforating artery.
* Branch of the anterior interosseal artery.
47 Inferior perforating interosseal artery.
** Dorsal ulnar artery.
48. Anterior carpal branches from the ulnar.
49. The superficial palmar arch cut away.
50, 50, 50, Deep palmar artery of the ulnar, which, by its anastomosis with the radial artery in the palm, completes the deep palmar arch.
51. Arteria magna pollicis.
52, 52. Anterior digito-radial artery of the thumb.

53, 53. Anterior digito-ulnar artery of the thumb.
54. Anastomosis of the two last arteries on the first phalanx of the thumb.
55. Arch formed by the inosculation of the same arteries on the second phalanx of the thumb.
56, 56, 56, Anterior digito-radial artery of the fore-finger.
57, 57, 57. Palmar interosseal arteries.
58, 58, 58. Perforating interosseal arteries.
59, 59, 59. Anastomosis of the palmar interosseal arteries with the digital.
60, 60, 60. Anterior digito-ulnar artery of the little finger.
*** Small branches from the deep palmar arch running to the anterior vascular net-work of the carpus.
61, 61, 61. The small trunks of the anterior digital arteries, which arise from the superficial palmar arch, cut.
62, 62, 62. Anterior digito-ulnar artery of the fore-finger.
63, 63, Anterior digito-radial artery of the middle finger.
64, 64. Digito-ulnar artery of the same finger.
65, 65. Digito-radial artery of the ring-finger.
66, 66. Digito-ulnar artery of the same finger.
67, 67. Digito-radial artery of the little finger.
68, 68, 68, 68. Vascular plexus formed on the first phalanx of each finger by its digital arteries.
69 69, 69, 69. Similar anastomosis on the second phalanges.
70, 70, 70, 70. Arches formed on the third phalanges by the digital arteries. From these arches very small twigs arise.
71, 71, 71, 71, 71, 71, 71, 71. Small branches which the anterior digital arteries send to the backs of the fingers.

PL. XII.

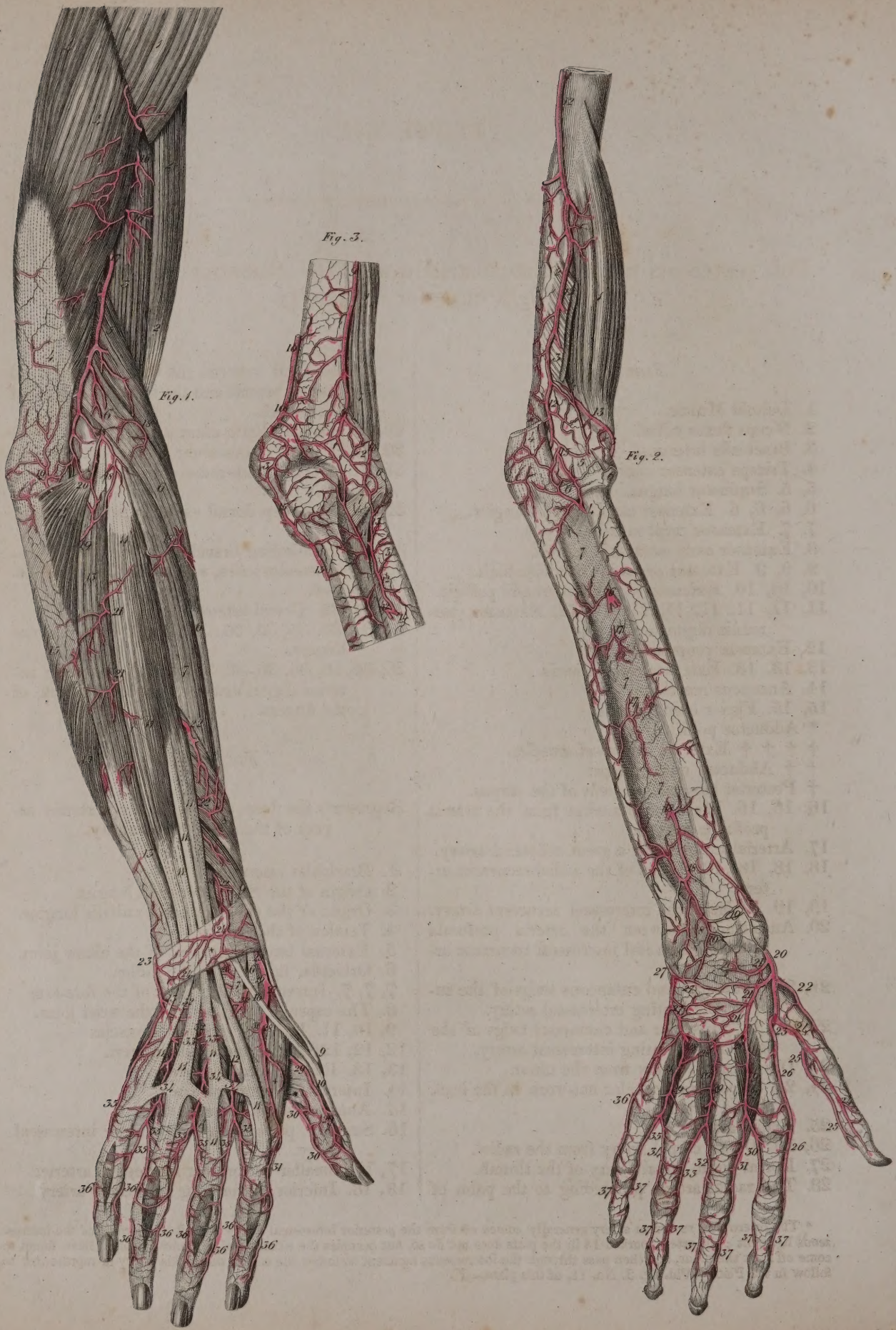


Fig. 1.

Fig. 3.

Fig. 2.

E. Mitchell sculp.

PLATE XII.

This represents the Regular Distribution of the Posterior Arteries of the Right Superior Extremity.

Figure I.

1. Deltoid Muscle.
2. Biceps flexor cubiti.
3. Brachialis internus.
4. Triceps extensor cubiti.
5, 5. Supinator longus.
6, 6, 6, 6. Extensor carpi radialis longior.
7, 7. Extensor carpi radialis brevior.
8. Extensor ossis metacarpi pollicis.
9, 9, 9. Extensor primi internodii pollicis.
10, 10, 10. Extensor secundi internodii pollicis.
11, 11, 11, 11, 11, 11, 11, 11. Extensor communis digitorum.
12. Extensor proprius indicis.
13, 13, 13. Extensor carpi ulnaris.
14. Anconeus muscle.
15, 15. Flexor carpi ulnaris.
* Adductor pollicis.
† † † † External interossei muscles.
† † Abductor minimi digiti.
† Posterior annular ligament of the carpus.
16, 16, 16. Muscular branches from the arteria profunda humeri.
17. Arteria profunda, or a great collateral artery.
18, 18, 18, 18. Twigs of the radial recurrent artery.
19, 19. Twigs of the interosseal recurrent artery.
20. Anastomosis between the arteria profunda and the radial and interosseal recurrent arteries.
21, 21. Muscular and cutaneous twigs of the superior perforating interosseal artery.
22, 22, 22. Muscular and cutaneous twigs of the inferior perforating interosseal artery.
23. Dorsal carpal artery from the ulnar.
24, 24. Superficial vascular net-work in the back of the carpus.
25. Radial artery.
26, 26. Dorsal carpal artery from the radial.
27. Dorsal digito-radial artery of the thumb.
28. The radial artery proceeding to the palm of the hand between the first external interosseous muscle and the metacarpal bone of the thumb.
29, 29. Dorsal digito-ulnar artery of the thumb.
30, 30. Palmar digito-ulnar artery of the thumb.
31, 31. Dorsal digito-radial artery of the fore-finger.
32, 32, 32. Deep dorsal vascular net-work of the carpus.
33, 33. Perforating branches of the palmar interosseal arteries, which join the carpal net-work.
34, 34, 34. Dorsal interosseal arteries.
35, 35, 35, 35, 35, 35, 35. Dorsal arteries of the fingers.
36, 36, 36, 36, 36, 36, 36. Twigs which the anterior digital arteries send to the back of the fingers.

Figure II.

Represents the deep arteries on the posterior aspect of the superior extremity.

1. Brachialis internus.
2. Origin of the Supinator radii longus.
3. Origin of the extensor carpi radialis longior.
4. Tendon of the triceps.
5. External lateral ligament of the elbow joint.
6. Orbicular ligament of the radius.
7, 7, 7. Interosseous ligament of the fore-arm.
8. The capsular membrane of the wrist joint.
9, 10, 11. External interossei muscles.
12, 12, 12. Arteria profunda humeri.
13, 13. Radial recurrent artery.
14. Interosseal recurrent artery.*
15. Anastomosis of these arteries.
16. Superior perforating or posterior interosseal artery.
17, 17. Smaller perforating interosseal arteries.
18, 18. Inferior perforating interosseal artery.

* The interosseal recurrent artery generally comes off from the posterior interosseal artery after it has perforated the interosseous ligament ; the artery marked 14 in the plate does not do so, but occupies the situation of a branch which I have found to come off from the ulnar, and then pass through the interosseous ligament to follow the course which this artery is represented to follow in the Plate.—Vid. fig. 3. No. 11, of this plate.—K.

19, 19. Twigs to the dorsal vascular net-work of the carpus.
20. Radial artery.
21, 21, 21. Dorsal carpal twigs.
22. Dorsal digito-radial artery of the thumb.
23. Continuation of the radial artery going to the palm of the hand.
24, 24. Dorsal digito-ulnar artery of the thumb.
25, 25. Anterior digito-ulnar artery of the thumb.
26, 26. Dorsal digito-radial artery of the forefinger.
27, 27, 27. Dorsal carpal artery from the ulnar.
28, 28, 28. Perforating branches of the anterior interosseal arteries of the hand.
29, 29, 29. Dorsal interosseal arteries of the hand.
30. Dorsal digito-ulnar artery of the forefinger.
31. Dorsal digito-radial artery of the middle finger.
32. Dorsal digito-ulnar artery of the same finger.
33. Dorsal digito-radial artery of the ring finger.
34. Dorsal digito-ulnar artery of the same finger.
35. Dorsal digito-radial artery of the little finger.
36. Dorsal digito-ulnar artery of the same finger.
37, 37, 37, 37, 37, 37, 37, 37. Twigs, which the anterior digital arteries send to the back of the fingers.

Figure III.

This represents the Posterior Vascular Net-work of the Elbow Joint.

1, 1. Brachialis internus.
2. External condyle of the humerus.
3. Internal condyle.
4. Olecranon of the ulna.
5. Upper part of the radius.
6. External lateral ligament of the elbow joint.
7. Orbicular ligament of the head of the radius.
8. Posterior vascular net-work of the elbow joint.
9. The arteria profunda.
10. Radial recurrent artery.
11. A branch from the ulnar, which passing through the upper part of the interosseous ligament, runs in a recurrent direction upwards, to enter into the vascular net-work on the back of the elbow joint.
12. Interosseal recurrent artery.
13. Twigs of the same artery.
14. Superior perforating or posterior interosseal artery, cut.
15, 15. Posterior ulnar recurrent artery.
16, 16. Ramus anastomoticus, or inferior collateral artery.*

* The explanation of this figure is omitted in the original.—K.

PL. XIII.

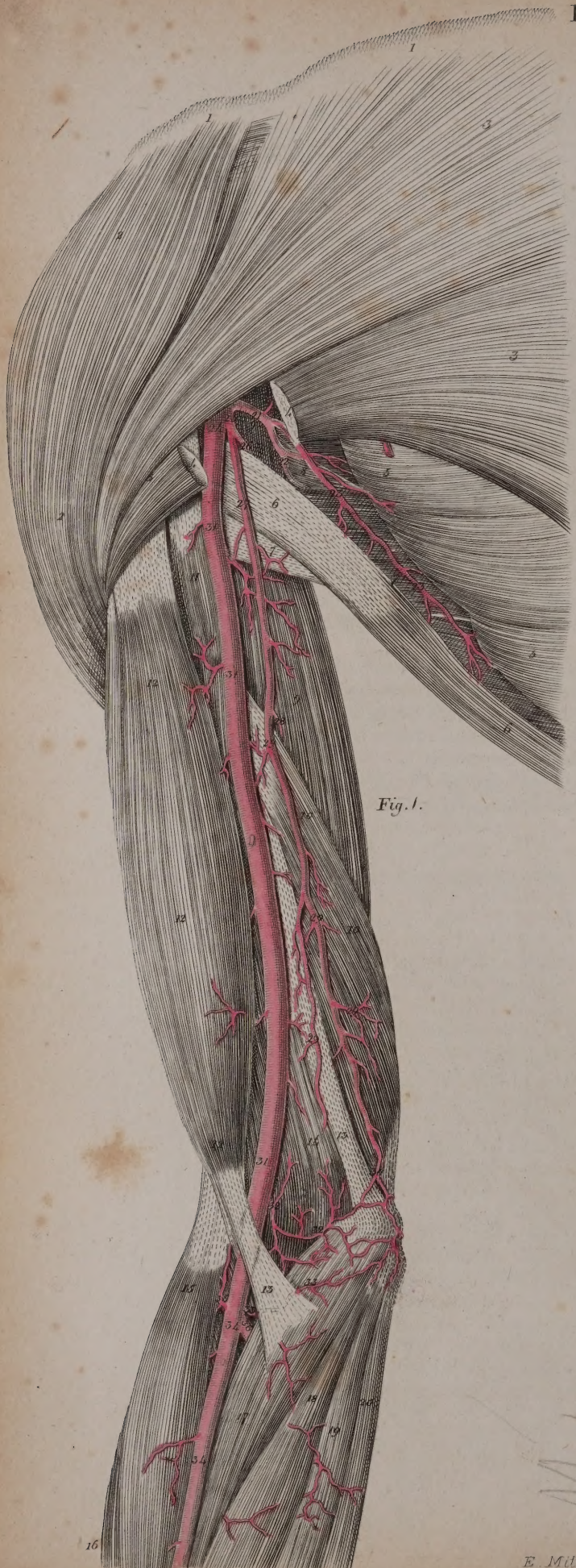


Fig. 1.

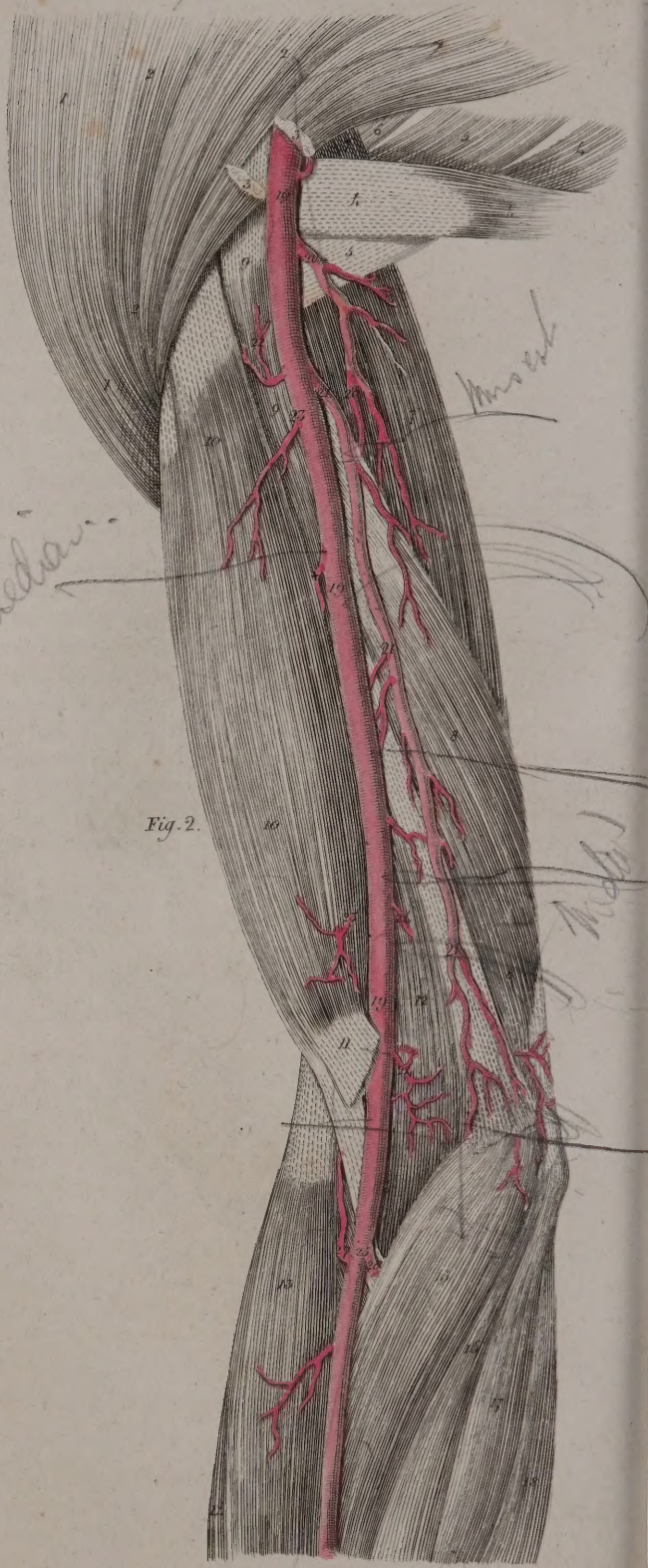


Fig. 2.

E. Mitchell. sculp.

PLATE XIII.

This represents the Varieties of the Arteria Profunda Humeri and Ramus Anastomoticus, or Ulnar Collateral.[a]

Figure I.

Arteria Profunda, arising from the Posterior Circumflex Artery of the Humerus.

1, 1. Clavicle.
2, 2. Deltoid muscle.
3, 3, 3. Pectoralis major.
4, 4. Portion of this muscle removed.
5, 5. Serratus anticus muscle.
6, 6. Latissimus Dorsi.
7, 7. Teres major.
8. Teres minor.
9, 9. Long head of the triceps.
10, 10. Short head of the triceps.
11. Coraco-brachialis.
12, 12, 12. Biceps flexor cubiti.
13. Aponeurosis of this muscle.
14. Brachialis internus.
15. Supinator Longus.
16. Extensor carpi radialis longior.
17. Pronator teres.
18. Flexor carpi radialis.
19. Palmaris longus.
20. Flexor carpi ulnaris.
21. Subscapular artery.
22. Circumflex artery of the scapula.
23, 23. Thoracic branch.
24. Axillary Artery.
25. Posterior circumflex artery of the humerus.
26. Circumflex branch.
27. Arteria profunda humeri.[b]
28. Branch of this artery descending between the heads of the triceps.
29, 29, 29, 29. Superior ulnar collateral artery.
30. Inosculation of this artery, with the second ulnar collateral and ulnar recurrent.
31, 31, 31. Brachial or humeral artery.
32, 32. Second ulnar collateral artery.
33, 33. Third ulnar collateral artery.
34, 34. Radial artery.
35. Radial recurrent artery.
36. Ulnar artery.

[a] Barclay has mentioned these varieties (l. c. p. 108.) "The profunda humeri rises sometimes from the scapular artery; sometimes from the scapular circumflex, and sometimes from the posterior or anconal circumflex. It is not only irregular in its origin, and mode of origin, but in its size, and in the number of its ramifications.

[b] I have twice observed this unusual origin of the arteria profunda. It is by no means rare for the arteria profunda to rise from the scapular artery itself, as Haller has well remarked. (*Iconum Anatomicorum*, Fasc. vi. p. 18.

Figure II.

Exhibits an unusual variety of the Ulnar Collateral Artery.[a]

1, 1. Deltoid.
2, 2, 2. Pectoralis major.
3, 3. Portion of this muscle cut out.
4, 4, 4. Latissimus dorsi.
5, 5. Teres major.
6. Teres minor.
7, 7. Long head of the triceps.
8, 8. Short head of the same.
9, 9. Coraco-brachialis.
10, 10, 10. Biceps flexor cubiti.
11. Its Aponeurotic expansion.
12. Brachialis internus.
13. Supinator longus.
14. Extensor carpi radialis longior.
15. Pronator teres.
16. Flexor carpi radialis.
17. Palmaris longus.
18. Flexor carpi ulnaris.
19, 19, 19. Brachial artery.
20, 20. Arteria profunda.
21, 21, 21. Great ulnar collateral.
22. Twig to the Coraco-brachialis.
23, 23. Small branches to the biceps.
† Arteria nutritia humeri.
24, 24. Small branches to the brachialis internus.
25. Division of the brachial artery into radial and ulnar.
26. Ulnar artery.
27. Radial recurrent artery.

The following Plates show the varieties of the Arteries of the superior extremities.

No artery in the human body is more liable to irregularity than the axillary and humeral arteries. For the most part the axillary artery is continued into the brachial, which proceeds without dividing, to the bend of the arm, where it divides in the radial and ulnar. Very frequently, however, this division does not take place at the bend of the arm, but considerably higher, nay,

[a] This variety often occurs.

even in the axilla itself. Andrew Laurentius[a] was the first who mentioned this variety, and described it as if regular. Bidloo[b] observed the high division of the humeral artery so frequent that he considered it as regular, and reckoned the brachial artery when single as an anomaly. J. Palfyn,[c] Laurentius Heister,[d] Moebius,[e] Elias Frid Heister,[f] Winslow,[g] Petsche,[h] Trew,[i] Hebenstreit,[k] Sharp,[l] H. F. de Dran,[m] Schmied.[n] Winkler,[o] Daubenton,[p] Ph. C. Fabricius,[q] Ph. A. Boehmer,[r] and Haller have seen this distribution[s] Peter Campert has, with impropriety, called in question the high division of the brachial artery; for since that time it has been observed by Ballay,[u] C. G. Ludwig,[x] Isenflamm,[y] Pohl,[z] Sabatier,[a] Ed. Sandifort,[b] Penchianat,[c] J. C. A. Mayer,[d] Ad. Murray,[e] S. Th. Soemmering,[f] Hildebrand,[g] J. Bell,[h] Portal,[i] Allan Burns,[k] G. Ryan,[l] Barclay,[m] Al. Monro, jun.[n] Fleischmann,[o] and J. Meckel.[p]

I have seen this variety very often, and I transmitted to the academy of sciences at Munich, eight years ago, several observations descriptive of it.[q]

The high division of the humeral artery is frequently met with in both arms. Heister, Petsche, Monro, Meckel, and others, have seen this. I have several times observed it. Men of short stature are principally liable to this variety.

It is the duty of the surgeon to attend to this variety, either when he performs venesection, operates for aneurism, or amputates the arm. The high division of the trunk of the brachial artery is easily ascertained by the pulsation of the arteries. If the trunk of the brachial artery has reached the elbow without dividing, the pulsation of one artery only is felt in the middle of the arm; but if it divides above the bend of the arm, two arteries are felt pulsating. Those surgeons who wish to open the median vein ought to pay particular attention to these circumstances, lest they should wound either the one or the other of the arteries.

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[a] Historia Anatomica. Corp. Hum. Francof. 1600, Fol. p. 105. The subclavian artery, after it has reached the axilla is called the axillary artery, from which are given off the thoracic and basilic arteries. The thoracic is double, one branch of which is sent to the anterior muscles of the chest, the other to the posterior. The basilic is also perceived to consist of two portions, a deep and subcutaneous: each separates into various ramifications; there is, however, a small branch of the subcutaneous observable at the wrist in the part where the pulse is usually felt.

[b] Idonis Wolf, Observ. Chirurgico-Medicae Quedlinburg, 1704, 4.

[c] Anat. Chirurgicale, Paris 1726, T. ii. p. 272.

[d] Compendium Anatomicum, p. 157, Not. 66, Acta Physico-Medica, vol. vii. Obs. 35, p. 34.

[e] Obser. Medic. Miscellan. Theor. et Pract. Helmst. 1731.

[f] Diss. Praes. Heister de Nova Brachium Amputandi Ratione, no. 31.

[g] Exposition Anat. de la Structure du Corps Hum. p. 377. sect. 143. It rarely happens that instead of this bifurcation, the brachial artery divides at its origin into two large branches.

[h] Sylloge Observat. Anat. Select. Halae, 1736, § 54, 55.

[i] Commerc. Litter. Noriberg. Ann. 1737, Hebd. 24, p. 186. Acta Physico-Medica, vol. x. App. p. 369.—History and Cure of a false Aneurism, caused by opening the Basilic Vein, Norimbergae, 1769, 4 c. Fig. Trew saw this distribution of the arteries several times.

[k] De Arteriar, c. h. Confinüs, Lips. 1739, p. 6.

[l] A Treatise upon the Operations of Surgery, Lond. 1740, cap. 36, he says, "If the humeral artery happens to divide above the elbow, *which is not very uncommon*, the prospect of cure is better, and the pulse will be stronger after the operation."

[m] Traité des Operat. de Chirurg, Paris, 1742.

[n] De Varietate Vasorum Plerumque Magni Momenti. Erlang. 1745.

[o] Diss. de Arteria Brachii, Goett. 1745, No. 49, 50.

[p] Buffon, Histoire Naturelle avec la Description du Cabinet du Roy, Paris, 1749, T. iii. p. 159, No. 312.

[q] Progr. ad Anatom. Anni, 1749, Helmst. 1749, p. 13.—Observationes Aliquae Anatomicae, Helmst. 1754, 4.

[r] Observation. Anatom. Rarior. Fasc. Halae. 1752, Fol. Prefat, p. 11. It is not unusual for the brachial Artery to be divided into two.

[s] Icon. Anat. Fasc. VI. Goetting. 1753, p. 34. Examples of this arrangement are rare.

[t] Demonst. Anatomico-pathologic. Amstel. 1760, Lib. 1, p. 15. I doubt much its existence, for Eustachius, who is most correct regarding the varieties of the arteries, has not given a delineation of it; neither is it mentioned by Haller, who, next to Eustachius, has done most in this part of Anatomy; and if my authority is of any weight, I confess that I never witnessed a higher division into radial and ulnar than that which I have represented.

[u] Sammlung. Anserlesener Wahrenehmungen aus der Arzneiwissen Schaft, a. d. Französ, Strassbourg, 1764, B. 8, s. 336.

[x] Progr. de Variantibus Arteriae Brachialis ramis in Aneurismatis Operatione Attendendis, Lips. 1767.

[y] De Difficili in Obser. Anat. Epicrisi. Comment. 3, § 13.

[z] Observat. Angiologicae de Arterüs, Lips. 1743, p. 8.

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[a] Traité Complet d'Anatomie, Paris, 1781, T. 3, p. 68. The humeral artery is one of those which presents the most varieties; it is often seen to divide at the middle part and at the upper part of the arm.

[b] Observat. Anatomico-Pathologic. Lib. 2, p. 127, Lib. 4, p. 93.

[c] Sur les Aneurysmes des Arteres du Bras. In Mem. de l'Ac. de Turin, 1784, b. 177.

[d] Beschreibung der Blutgefässe des Menschlichen Körpers, Berlin, 1788, s. 129.

[e] Descriptio Arteriarum, c, h. Lips. 1794, p. 61.

[f] De Corporis Humani Fabrica, T. v. p. 201.

[g] Lehrbuch der Anatomie des Menschen, b. 4, s. 87.

[h] Anatomy, Edin. 1797, vol. ii. p. 360.

[i] Cours D'Anatomie Medicale, Paris, 1804, T. iii. p. 238.

[k] Von Einigen der Häufigsten und Wichtigsten Herzkrankheiten, a. d. Engl. Lemgo, 1813, p. 336.

[l] Diss. de Quarundam Arteriarum in Corpore Humano Distributione, Edin. 1812.

[m] A Description of the Arteries of the Human Body, Edin. 1812, p. 100. The high division occurs so often that we can hardly, with any propriety, call it an anomaly.

[n] Outlines of the Anatomy of the Human Body, Edin. 1813, vol. iii. p. 303.

[o] Leichenoffnungen. Erlangen, 1815, s. 230.

[p] Ueber den regelwidrigen Verlauf der Armpulsadern. Im Deutschen Archiv. für die Physiologie, b. 2, s. 117.—Tabula Anatomico-Pathologic. Fasc. 2, Tab. 11.

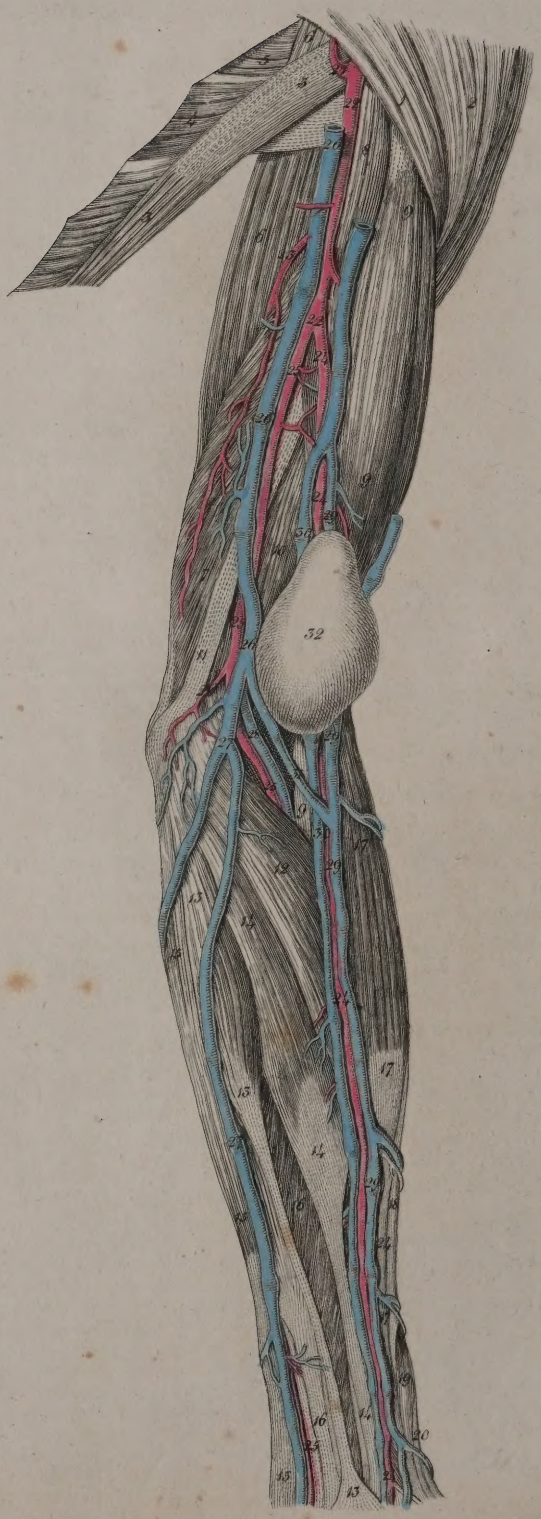
[q] Beobachtungen über die hohe Theilung der Armschlagader in die Speichen—und Ellenbogen—Schlagader. In den Denkscriften der Akademie der Wissenschaften Zu München für die, Jahre, 1816 und 1817, b. 6, s. 3.

The high division of the humeral artery occurs in several of the inferior animals. The very celebrated Cuvier (Anatomie Comparée, t. iv. p. 251,) observed this disposition in the didelphi and kanguroo. I have observed it in the simia capucina, apella, sabaea, sciurea, and lemur gracilis, (Ueber einen am oberarmbein bei mehreren geschwänzten affen vorkommenden kanal und eine damit in ver. bindung stehende Anordnung der Arterien und Nerven des Arms. Im deutschen Archiv für die Physiologie, b. 4, s. 544,) also in the civet, the dog, the fox, the wolf, and other mammalia.

PL.XIV.

Fig.1.

Fig.2.



E.Mitchell sculp.

PLATE XIV.

Figure I.

This represents the Right Arm of a Man, in which the high bifurcation of the Axillary Artery is seen. The Radial Artery, in both arms, proceeded from the Axillary Artery, and ran between the Aponeurosis and Skin of the Arm.[a]

1. The Clavicle.
2. The Deltoid muscle.
3, 3. The Pectoralis major.
4, 4. Serratus magnus.
5. Latissimus Dorsi.
6, 6. Teres major.
7. Teres minor.
8. Coraco-brachialis.
9, 9, 9. The long head of the triceps.
10. The short head of the triceps.
11. Intermuscular ligament of the arm.
12, 12. Biceps.
13. Aponeurotic portion of the same muscle.
14. Brachialis internus.
15, 15. Pronator teres.
16, 16. Palmaris longus.
17, 17. Flexor carpi radialis.
18, 18. Flexor carpi ulnaris.
19, 19. Flexors of the fingers.
20. Flexor longus pollicis.
21, 21, 21. Supinator longus.
22. Extensor carpi radialis longior.
23. Supinator brevis.
24. Axillary artery.
25. Subscapular artery.
26. Circumflex artery of the scapula.
27. Thoracic branch.
28, 28, 28, 28. Radial artery, arising from the axillary.
29. Radial recurrent artery
30, 30, 30, 30. Humeral artery, which ends in the ulnar.
31. Posterior circumflex artery of the humerus.
32. Profunda humeri.
33. Ramus Anastomoticus.

[a] Laurence Heister (l. c.) and El. Fr. Heister (l. c. No. 31.) saw in the right arm of a woman, the radial artery arising from the axillary; Ph. Ad. Boehmer (l. c.), in the right arm of a male subject; Ludwig (l. c.p. 8.) saw, in the right arm of a female subject, the brachial artery running as usual, but at the bend of the elbow it formed a pretty large anastomosis, by which it was united to the radial; Sandifort (l. c. Lib. 4. p. 93.) remarked it in a right arm; Mayer (l. c.) also; Ryan (l. c.) saw five specimens of it in Dr. Monro's museum; J. Fr. Meckel (Archiv. B. 2. S. 127.) met with it three times. I have observed this unusual origin and course of the radial artery: in the right arm of a new born infant; in the right arm of a girl of four years; in the right arm of a boy; in the left arm of a woman; in the right arm of a woman; in the left arm of a young man; in both arms of a man of forty years old; in the right arm of a woman of sixty,—in the left arm of this subject the ulnar artery arose from the axillary.

The radial artery is either enclosed by the aponeurosis of the arm or perforating it, runs with the cephalic vein immediately under the skin.

Figure II.

Shows the left arm of a woman, in which the radial artery came off from the humeral.[a] The radial artery was wounded by the Surgeon when opening the cephalic vein, whence arose an aneurism.

1. The Pectoralis major.
2. Deltoid.
3, 3. Latissimus dorsi.
4. Teres major.
5. Teres minor.
6, 6. Long head of the triceps.
7. Short head of the same muscle.
8. Coraco-brachialis.
9, 9, 9. Biceps.
10. Brachialis internus.
11. Internal intermuscular ligament.
12. Pronator teres.
13, 13, 13. Palmaris longus.
14, 14, 14. Flexor carpi radialis.
15, 15, 15. Flexor carpi ulnaris.
16, 16. Flexors of the fingers.
17, 17, 17. Supinator longus.
18. Extensor carpi radialis longior.
19. Extensor ossis metacarpi pollicis.
20. Extensor primi internodii pollicis.
21. Posterior circumflex artery of the humerus.
22, 22. Humeral artery.
23. Arteria profunda humeri.
24, 24, 24, 24. Radial artery.
25, 25, 25, 25. Ulnar artery.
26, 26, 26. Humeral vein.
27, 27. Basilic vein.
28. Ulnar vein.
29, 29, 29, 29. Cephalic vein.
30. Radial vein.
31. Median vein.
32. Aneurismal sac.

[a] This variety very frequently occurs. It was seen, in both arms by Laurence Heister (l. c. not. 66.), by Moebius (l. c. obs. 8.), Trew (l. c. fig 5.), Petsche (l. c. No. 55.), Eschenbach (l. c. No. 1141.), Winkler (l. c. No. 50.), Schmiedel (l. c. No. 9.), Haller (l. c. p. 34.), Ernest. Hebenstreit (l. c.), Ludwig (l. c. p. 6.), Ballay (l. c. p. 336.), Penchianati (l. c.), Sandifort (l. c. lib. 4. p. 93.) in the right arm of a woman; by Soemmering (l. c. p. 301.), Ryan (l. c.), Monro (l. c. p. 301. pl. 44. fig. 3.), Burns (l. c.), Barclay (l. c. p. 104. This case is common), and J. F. Meckel (Tabula Anatomico-pathol. Fasc. 2. Tab. 11. Fig 5. 7.) I have observed it in both arms of a girl, in both arms of a woman of thirty years old, in both arms of a woman of sixty, in both arms of a young man, in both arms of a man of seventy, in the right arm of a woman, and in the left arm of a man. The radial artery is either covered by the brachial aponeurosis, or runs along with the cephalic vein between it and the skin.

PL.XV.

Fig. 1.

Fig. 2.

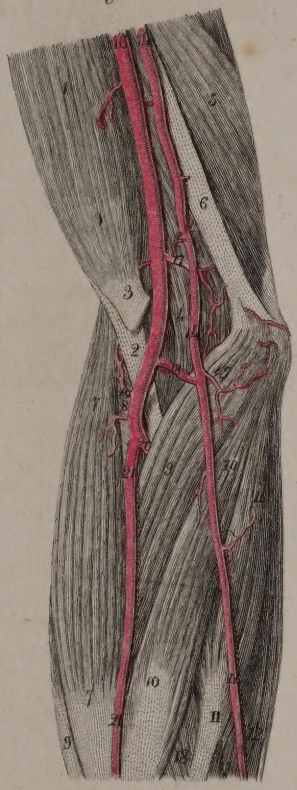
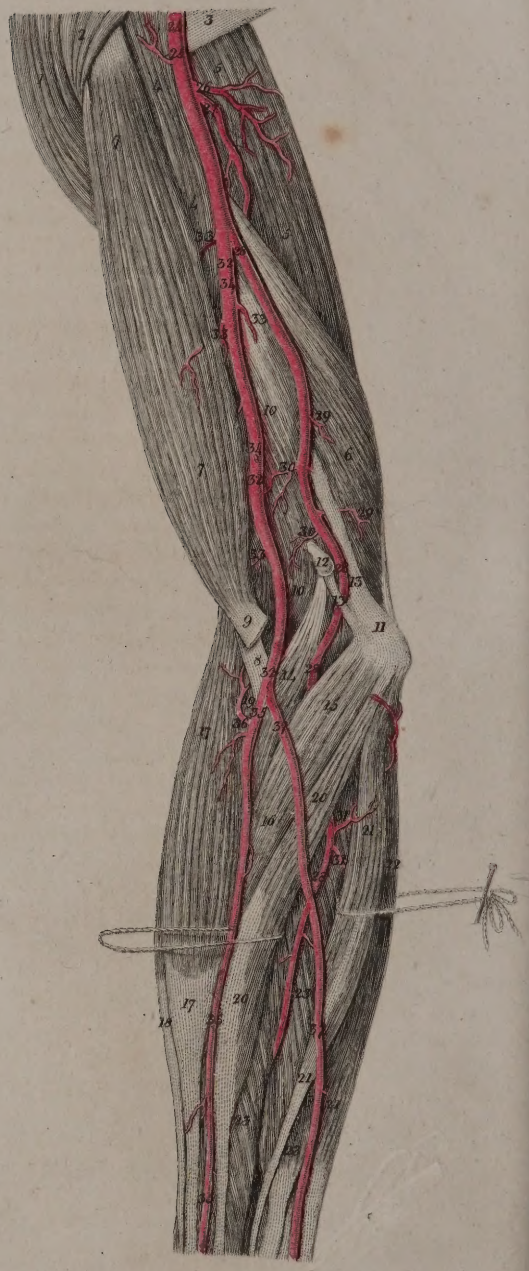


Fig 3



F.Mitchell sculp.

PLATE XV.

Figure I.

This shows the left arm of a man, in which the ulnar artery arises from the humeral.[a]

1. Deltoid muscle.
2. Tendon of the latissimus dorsi.
3. Biceps.
4. Aponeurotic portion of this muscle.
5. Coraco-brachialis.
6. Long head of the triceps.
7. Short head of the same muscle.
8, 8. Intermuscular ligament.
9. Brachialis internus.
10, 10, 10. Supinator longus.
11, 11. Extensor carpi radialis longior.
12. Supinator brevis.
13, 13. Pronator teres.
14, 14. Flexor carpi radialis.
15, 15, 15. Palmaris longus.
16, 16, 16, Flexor carpi ulnaris.
17, 17, 17. Common flexors of the fingers.
18, 18. Flexor longus pollicis.
19. Extensor ossis metacarpi pollicis
20. Extensor primi internodii pollicis.
21. Humeral artery.
22. Arteria profunda.
23. Division of the humeral artery into the ulnar and radial.
24. Ulnar artery.
25. A twig to the biceps.
26. Ulnar collateral artery.
27. Twig to the brachialis internus.
28. Twig to the pronator teres.
29. Cutaneous twigs, cut.
30. Twig to the palmaris longus.
31, 31, 31. Twigs to the flexors of the fingers.
32, 32. Continuation of the humeral artery, which divides into the radial and interosseal arteries.
33, 33. Ramus anastomoticus magnus.
34. Radial recurrent artery.
35, 35, 35, 35. Radial artery.
36. Interosseal artery.
37. Twig to the supinator longus muscle.

[a] This variety is rare. It has been seen by Petsche, (l. c. § 55.) Pohl, (l. c. p. 9.) Sandifort, (l. c. p. 93,) and J. F. Meckel, (Deutsch. Archiv. f. d. Physiolog. B. 2. p. 127. Tabul. Anatomico-Patholog. Fasc. 2, Tab. 11, fig. 4.) I have seen this disposition in the right arm of a boy of twelve years old; the ulnar artery ran between the skin and the aponeurosis of the arm. The distribution of the arteries in the left arm was regular. I have moreover observed it in the left arm of a woman, and in the right arm of a man, in both which cases the ulnar artery was under the aponeurosis.

Figure II.

Represents the ulnar artery given off from the axillary in the right arm of a man;[a] there is a pretty large anastomosis between the ulnar and the humeral.

1, 1. Biceps.
2. Tendon of this muscle.
3. Aponeurotic portion.
4. Brachialis internus.
5. Short head of the triceps.
6. Intermuscular ligament.
7, 7. Supinator longus.
8. Supinator brevis.
9. Pronator teres.
10, 10. Flexor carpi radialis
11, 11. Palmaris longus.
12. Flexor carpi ulnaris.
13. Flexor sublimis digitorum.
14, 14, 14. Ulnar artery, which was given off from the axillary.
15. Ulnar recurrent artery.
16, 16. Humeral artery.
17. Ramus anastomoticus.
18. Anastomosing branch between the humeral and ulnar arteries.
19. Radial recurrent artery.
20. Interosseal artery.
21, 21. Radial artery.

[a] The origin of the ulnar artery from the axillary is rather common. It has been seen by Mayer (l. c. p. 129,), Burns (l. c. p. 336,) Ryan (l. c. p. 12,) Monro (outlines pl. 44. Fig. 2,) Barclay (l. c. p. 104. This case is frequent,) Fleischmann (Leichenöffnungen, p. 228,) and J. F. Meckel (Archiv. B. 2, p. 126.) I have found it in the left arm of an infant, and in the right arm of a man.

Figure III.

Exhibits the right arm of a woman, in which the interosseal artery arose from the humeral.[a]

1. Deltoid.
2. Insertion of the pectoralis major.
3. Termination of the latissimus dorsi.
4, 4. Coraco-brachialis.
5, 5. Long head of the triceps.
6, 6. Short head of the same.
7, 7. Biceps.
8. Tendon of this muscle.
9. Its aponeurosis.
10. Brachialis internus.
11. Internal condyle of the humerus.
12. An unusual excrescence from the humerus.
13, 13. Internal intermuscular ligament.
14. An unusual portion of the pronator teres arising from the osseous excrescence.
15. Pronator teres.
16. Insertion of the pronator.
17, 17. Supinator longus.
18. Extensor carpi radialis longior.
19. Supinator brevis.
20, 20. Flexor carpi radialis.
21, 21. Palmaris longus.
22, 22. Flexor carpi ulnaris.
23, 23. Common flexors of the fingers.
24. Humeral artery.
25. Twig to the coraco-brachialis.
26. Twig to the long head of the triceps.
27. Profunda humeri.
28, 28, 28, 28. Interosseal artery coming off from the humeral.
29, 29. Twigs to the short head of the triceps.
30, 30. Twigs to the brachialis internus.
31, 31. Twigs to the palmaris longus.
32, 32, 32. Trunk of the humeral artery.
33, 33, 33. Twigs to the biceps and brachialis internus.
34, 34. Cutaneous twigs, cut.
35, 35, 35. Radial artery.
36. Radial recurrent artery.
37, 37. Ulnar artery running on the surface of the forearm.

[a] This rare distribution of the arteries of the arm has been observed by Ludwig, (l. c. p. 7.) in a female subject, whose bones were soft, Sabater, (l. c. p. 69.) Hildebrandt (l. c. B. 4. p. 87.) A. Monro (l. c. vol. iii. p. 304. The interosseous artery sometimes arises from the middle of the humeral artery,) and Barclay (l. c. p. 104. note *u*.) I have only seen it once.

PL.XVI.

Fig. 1.

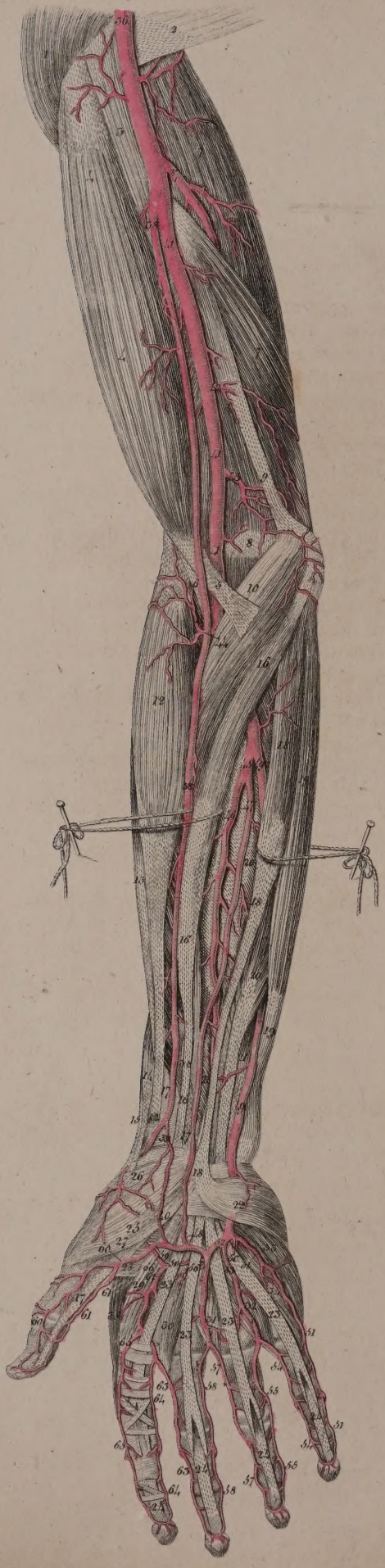
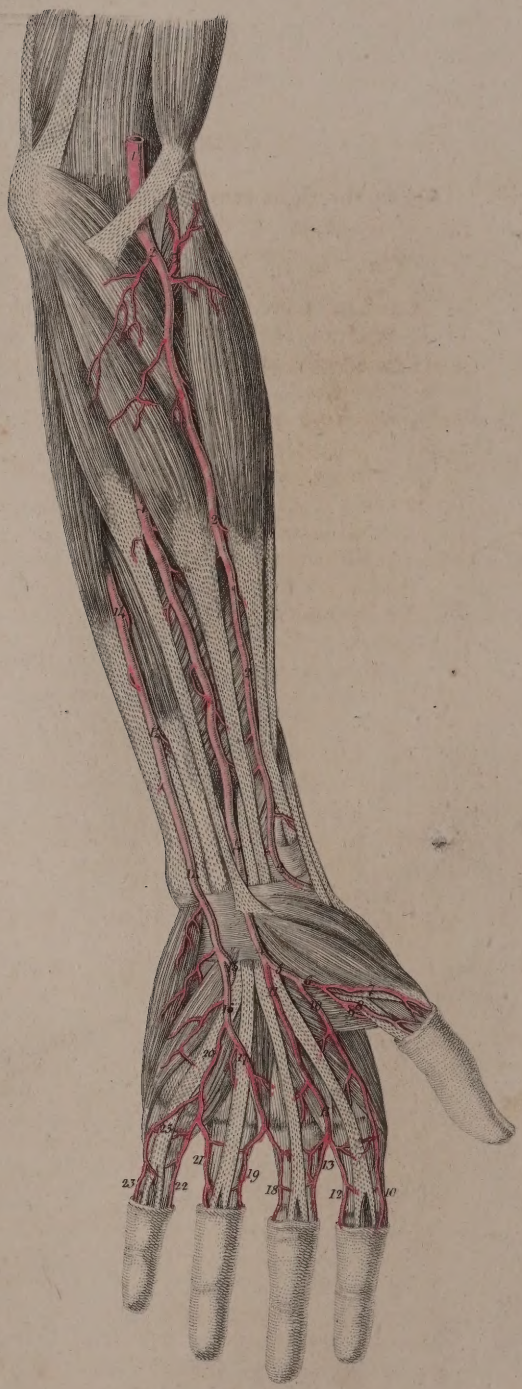


Fig. 2.



E. Mitchell, sculp.

PLATE XVI.

Figure I.

Shows the right arm of a man in which the high bifurcation of the humeral artery, and an unusual artery are seen.

1. Insertion of the pectoralis major.
2. Insertion of the latissimus dorsi.
3. Coraco-brachialis.
4, 4. Biceps.
5. Aponeurotic portion of this muscle.
6. Tendon of the biceps.
7, 7. Triceps extensor cubiti.
8. Brachialis internus.
9. Internal intermuscular ligament.
10. Pronator teres.
11. Supinator brevis.
12, 12. Supinator longus.
13. Extensor carpi radialis longior.
14. Extensor ossis metacarpi pollicis.
15. Extensor primi internodii pollicis.
16, 16, 16. Flexor carpi radialis.
17, 17. Flexor longus pollicis.
18, 18, 18. Palmaris longus.
19, 19. Flexor carpi ulnaris.
20, 20. Flexor communis digitorum sublimis.
21, 21. Flexor communis digitorum profundus.
22. Palmaris brevis.
23, 23, 23, 23. Tendons of the flexor sublimis, or perforatus.
24, 24, 24, 24. Tendons of the flexor profundus or perforans.
25. Abductor pollicis.
26. Opponens pollicis.
27. Flexor brevis pollicis.
28 Adductor pollicis.
29, 30, 31, 32. Lumbricales muscles.
33. Abductor minimi digiti.
34. Flexor brevis minimi digiti.
35. First external interosseous muscle.
36. Humeral artery.
37. Arteria profunda.
38, 38, 38. Radial artery.
39. Superficial volar branch.
40. Its union with the superficial palmar arch.
41, 41, 41. Humeral artery continued into the ulnar.
42. Branch to the triceps.
43. Ramus anastomoticus magnus.
44. Radial recurrent artery.
45. Interosseal artery.
46. Anterior interosseal artery.
47. An unusual superficial interosseal artery.
48. Its anastomosis with the superficial palmar arch.
49, 49. Ulnar artery.
50, 50. Deep volar artery.
51, 51, 51. Digito-ulnar artery of the little finger.
52. Superficial volar artery.
53. Second digital artery, which divides into,
54, 54. The digito-radial artery of the little finger, and
55, 55. The digito-ulnar artery of the ring finger.
56. Third digital artery, which divides into,
57, 57. The digito-radial artery of the ring finger, and
58, 58. The digito-ulnar artery of the middle finger.
59. Arteria magna pollicis.
60, 60. Anterior digito-radial artery of the thumb.
61, 61. Anterior digito-ulnar artery of the thumb.
62. Fourth digital artery coming from the deep volar artery.
63, 63. Anterior digito-radial artery of the middle finger.
64, 64. Anterior digito-ulnar artery of the forefinger.
65, 65. Anterior digito-radial artery of the forefinger.
66. Communicating branch, with the deep volar artery, from the radial artery.

Figure II.

Exhibits the left arm of a woman, in which an unusual superficial interosseal artery is observed.[a]

[a] Haller (Icon. Anat. Fasc. 6. p. 33.) observed a similar case. He says: Caeterum non penitus omittere visum est, mirificam varietatem, quam semel omnino anno 1745 M. Septembri vidi. Ex ipsa fere origine arteriæ interosseæ ramus provenit, sodalis mediani nervi, inter sublimem et profundum flexorem, quorum utrique ramos dedit, venitque cum ipsis ad latus radiale medii digiti et ulnare indicis, dedit ramum pollicis abductori, inosculatum radiali arteriæ pollicis, et una cum ea arteria ulnarem pollicis et arteriam radialem volarem indicis constituit. Semel etiam ex ipsa origine arteriæ interosseæ ramum prodiisse vidi, qui ad volam venit, et superficialem arcum constituit, qui solet a radiali nasci.

1. Humeral artery.
2, 2, 2, 2. A radial artery of small size which sends no branch to the palm.
3. Radial recurrent artery.
4, 4, 4. Superficial interosseal artery, which might be called *median artery*, as it accompanies the median nerve.

Ludwig (l. c. p. 9,) described a similar variety: in an infant six months old, in whom the humeral artery gave off the radial at the usual place, which extended to the hand, but another radial came off from the side of the interosseal, descended on the inner side of the radius, and passed under the transverse ligament of the carpus to the palm of the hand.

Sabatier (l. c. T. 3. p. 69,) says: "J'ai vu l'artere humerale produire une radiale et une cubitale ordinaire, et une seconde cubitale qui descendoit derriere les tegumens le long du bord interne de l'avant-bras, jusqu' au poignet où elle fournissoit l'arcade palmaire, pendant que la vraie cubitale s'y terminoit par des branches tres petites."

Allan Burns (l. c. p. 348,) has well described this disposition of the interosseal artery.

Barclay (l. c. p. 120,) says "Sometimes there are more interosseals than one, whether it arise from the humeral separately, or terminate the humeral along with the ulnar, or along with the radial, or along with the radial and ulnar together, is always seen on the thenal aspect in the middle, between the radius and ulna; always deeper than the sublimis, always extending some of its branches as far as the carpus, though seldom so far as the points of the fingers."

"In rare cases, where it runs immediately under the sublimis, and extends to the fingers, there is usually another interosseal artery, either a branch, or a separate trunk between the sublimis and the flexor longus pollicis."

5, 6. Arteria magna pollicis.
7. Dorsal digito-radial artery of the thumb.
8. Anterior digito-radial artery of the thumb.
9. Anterior digito-ulnar artery of the thumb.
10. Anterior digito-radial artery of the fore-finger.
11, 11. Digital artery, which divides into,
12. The anterior digito-ulnar artery of the fore-finger, and,
13. Anterior digito-radial artery of the middle-finger.
14, 14, 14. Ulnar artery.
15. Deep volar artery.
16. Small trunk of the digital arteries.
17. First digital artery.
18. Anterior digito-ulnar branch of the middle-finger.
19. Anterior digito-radial branch of the ring-finger.
20. Internal digital artery, which divides into,
21. Anterior digito-ulnar branch of the ring-finger,
22. Anterior digito-radial branch of the little-finger, and,
23, 23. Anterior digito-ulnar branch of the little-finger.

Fig. 1.

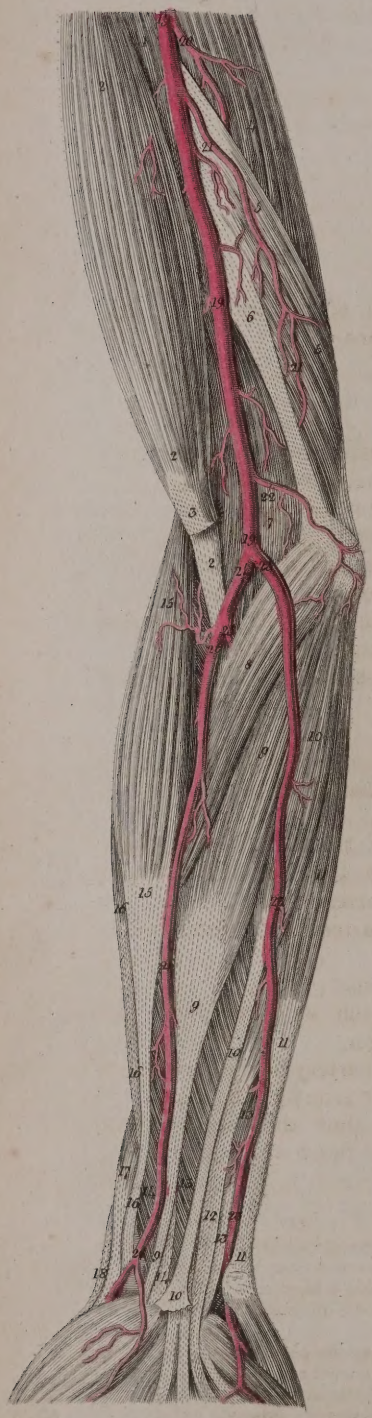


Fig. 2.

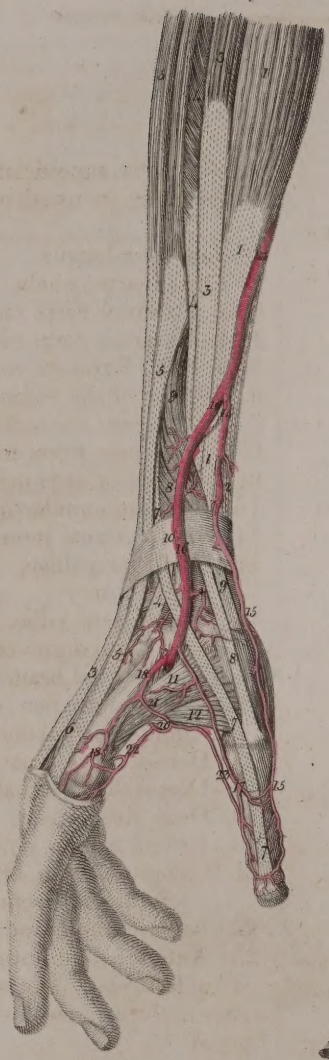


Fig. 3.

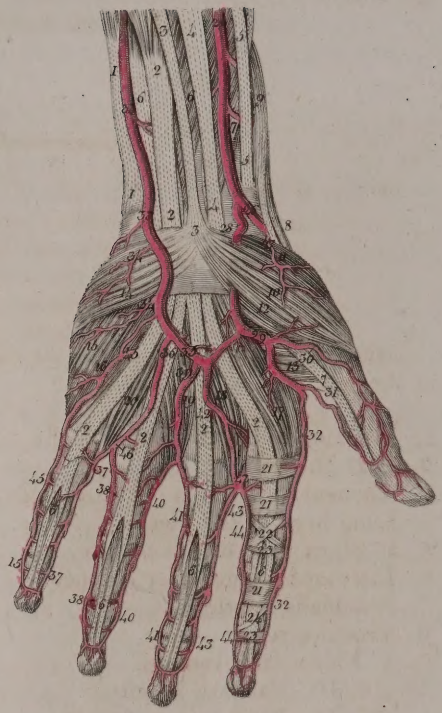
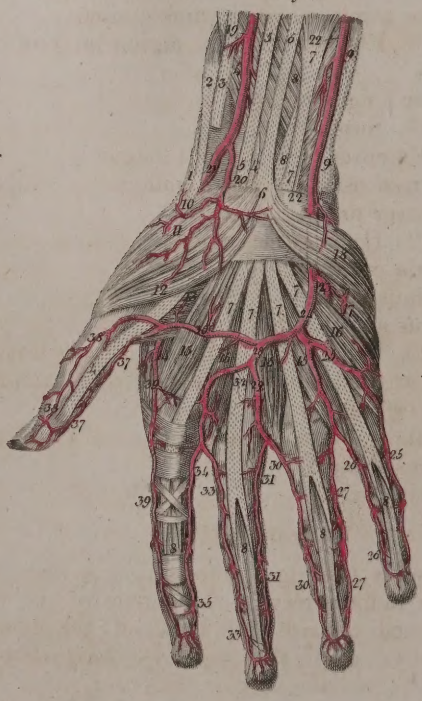


Fig. 4.



E. Mitchell sculp.

PLATE XVII.

Figure I.

Exhibits an unusual course of the ulnar artery in the right arm of a young man.[a]

1. Insertion of the coraco-brachialis.
2, 2, 2. Biceps.
3. Aponeurotic portion of this muscle.
4. Long head of the triceps.
5, 5. Short head of this muscle.
6. Internal intermuscular ligament.
7. Brachialis internus.
8. Pronator teres.
9, 9. Flexor carpi radialis.
10, 10, 10. Palmaris longus.
11, 11, 11. Flexor carpi ulnaris.
12. Flexor communis digitorum sublimis.
13, 13, 13. Flexor communis digitorum profundus.
14. Flexor longus pollicis.
15, 15, 15. Supinator longus.
16, 16. Extensor carpi radialis longior.
17. Extensor ossis metacarpi pollicis.
18. Extensor primi internodii.
19, 19, 19. Humeral artery.
20. Arteria profunda.
21. An unusual ulnar collateral artery.
22. Ramus anastomoticus magnus.
23, 23, 23. Ulnar artery arising from the humeral at the bend of the elbow, and running superficially on the fore-arm.
24. Trunk of the radial and interosseal arteries.
25. Interosseal artery.
26. Radial artery.

Figure II.

Represents the right fore-arm of a man, in which the radial artery, at the middle of the radius, passed towards the back of the hand, superficially, over the supinator longus, extensor carpi radialis longior, extensor carpi radialis brevior, and extensor muscles of the thumb. The superficialis volæ from the radial descended in its usual place.[a]

1. Supinator longus.
2. Flexor carpi radialis.
3, 3. Extensor carpi radialis longior.
4, 4. Extensor carpi radialis brevior.
5, 5, 5, 5. Extensor communis digitorum.
6. Tendon of the extensor proprius indicis.
7, 7. Extensor secundi internodii pollicis.
8, 8. Extensor primi internodii pollicis.
9, 9. Extensor ossis metacarpi pollicis.
10. Posterior annular ligament of the carpus.
11. First external interosseous muscle.
12. Adductor pollicis.
13. Radial artery.
14. Superficialis volæ.
15, 15. Dorsal digito-radial artery of the thumb.
†. Dorsal carpal branch.
16, 16. Continuation of the radial artery running superficially to the back of the hand.
17. Dorsal digito-ulnar artery of the thumb.
18. Dorsal digito-radial artery of the forefinger.
19. Deep volar artery.
20. Arteria magna pollicis.
21. Communicating branch with the dorsal artery of the forefinger.
22. Anterior digito-radial artery of the forefinger.
23. Anterior digito-ulnar artery of the thumb.

The following figures show the principal varieties in the arteries of the hand which I have observed. [b]

[a] Allan Burns (l. c. p. 341.) observed this variety three times.

[a] Portal (Anat. Medicale, t. iii. p. 247.) has described this unusual course of the radial artery well. L'artere radiale se detourne quelquefois ; au lieu de passer sur le bord interne et anterieure du rayon, elle passe sur le bord arterieur externe, et il n'y a alors qu'une petite arteriole qui marche dans la direction du tronc.

Allan Burns (l. c. p. 343.) has also described it.

I have frequently seen this unusual course of the radial artery. I once observed it in both arms of a man, labouring under hectic fever, where there was no pulsation perceived at the usual place.

[b] The varieties of the arteries of the hand have been pointed out by Haller, (Icon. Anat. Fasc. vi. p. 36, 41.) Soemmering, (De Corp. hum. fabrica t. 5. p. 204, 222.) Allan Burns, (l. c. p. 344.) Ryan, (l. c.) Barclay, (l. c. p. 126.) J. F. Meckel, (Handbuch der menschlichen Anatomie, B. 3. S. 180, 190.) and others.

Figure III.

Represents the left hand of a man, in which the superficialis volæ is of a very large size. This variety often occurs.

1, 1. Flexor carpi ulnaris.
2, 2, 2, 2, 2, 2. Flexor communis digitorum sublimis.
3, 3. Palmaris longus.
4, 4. Flexor carpi radialis.
5, 5. Tendon of the supinator longus.
6, 6, 6, 6, 6, 6. Flexor communis digitorum profundus.
7, 7. Flexor longus pollicis.
8. Extensor primi internodii pollicis.
9. Extensor ossis metacarpi pollicis.
10. Abductor pollicis.
11. Opponens pollicis.
12. Flexor brevis pollicis.
13. Adductor pollicis.
14. Palmaris brevis.
15. Abductor minimi digiti.
16. Adductor minimi digiti.
17, 18, 19, 20. Lumbricales muscles.
21, 22, 23, 24. Ligamentous sheaths of the flexor tendons of the forefinger.
25, 25. Radial artery.
26. Trunk of the radial artery running towards the back of the hand.
27. Twig to the short muscles of the thumb.
28. The superficialis volæ of unusual size covered by the abductor pollicis.
29. Arteria magna pollicis.
30. Anterior digito-radial artery of the thumb.
31. Anterior digito-ulnar artery of the thumb.
32. Anterior digito-radial artery of the forefinger.
33, 33. Ulnar artery.
34, 34. Twigs to the palmaris brevis, the abductor and adductor minimi digiti
35. Superficial palmar arch which is formed by the ulnar and radial arteries.
36. First anterior digital artery, which divides into,
37, 37. Anterior digito-radial artery of the little finger, and
38, 38. Anterior digito-ulnar artery of the ring finger.
39. Second anterior digital artery, which divides into,
40, 40. Anterior digito-radial artery of the ring finger, and
41, 41. Anterior digito-ulnar artery of the middle finger.
42. Third anterior digital artery, which divides into,
43, 43. Anterior digito-radial artery of the middle finger, and
44, 44. Anterior digito-ulnar artery of the forefinger.
45, 45, 45. Anterior digito-ulnar artery of the little finger coming off from the deep palmar arch.
46. 47. Palmar interosseal arteries communicating with the digitals.

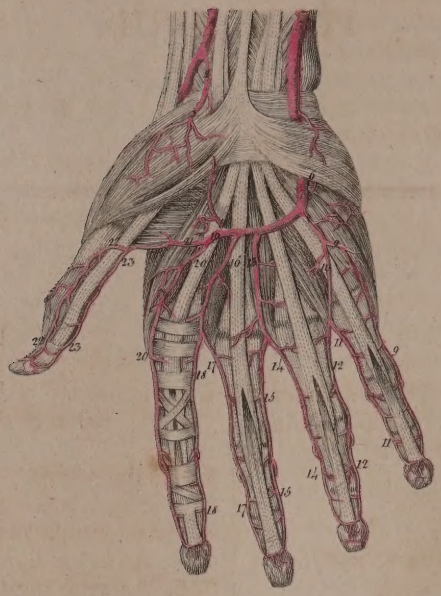
Figure IV.

This exhibits the right hand of a man, in which the ulnar artery alone forms the superficial palmar arch. This variety frequently occurs.

1. Extensor primi internodii pollicis.
2. Extensor ossis metacarpi pollicis.
3. Tendon of the supinator longus.
4. Flexor longus pollicis.
5, 5. Tendon of the flexor carpi radialis.
6, 6. Tendon of the palmaris longus.
7, 7, 7, 7, 7, 7. Flexor sublimis digitorum.
8, 8, 8, 8, 8, 8. Flexor profundus digitorum.
9, 9. Tendon of the flexor carpi ulnaris.
10. Opponens pollicis.
11. Abductor pollicis.
12. Flexor brevis pollicis.
13. Adductor pollicis.
14. First external interosseous muscle.
15, 15, 15, 15. Lumbricales.
16. Abductor minimi digiti.
17. Adductor minimi digiti.
18. Palmaris brevis.
19. Radial artery.
20. Superficialis volæ, sent to the small muscles of the thumb.
21. Trunk of the radial artery turning towards the back of the hand.
22, 22. Ulnar artery.
23. Deep palmar artery.
24. Superficial palmar arch formed by the ulnar alone.
† First digital artery, dividing into,
25, 25. The anterior digito-ulnar artery of the little finger,
26, 26. Anterior digito-radial artery of the same finger, and
27, 27. Anterior digito-ulnar artery of the ring-finger.
28. Trunk of the second and third digital arteries.
29. Second digital artery, which divides into,
30. The anterior digito-radial artery of the ring-finger, and
31, 31. The anterior digito-ulnar artery of the middle finger.
32. Third digital artery, which divides into,
33, 33. The anterior digito-radial artery of the middle finger, and
34. 35. Anterior digito-ulnar artery of the forefinger.
36. Arteria magna pollicis.
37. Anterior digito-ulnar artery of the thumb.
38, 38. Anterior digito-radial artery of the thumb.
39, 39. Anterior digito-radial artery of the forefinger.

PL. XVIII.

Fig. 1.



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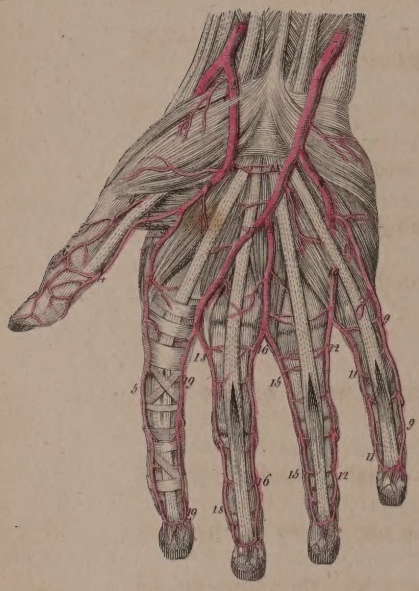

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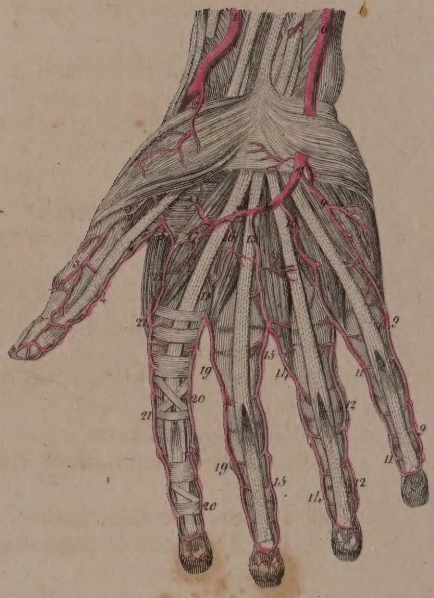

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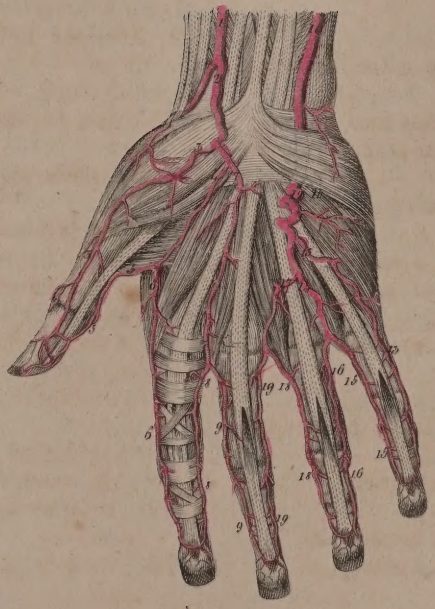


Fig. 5.

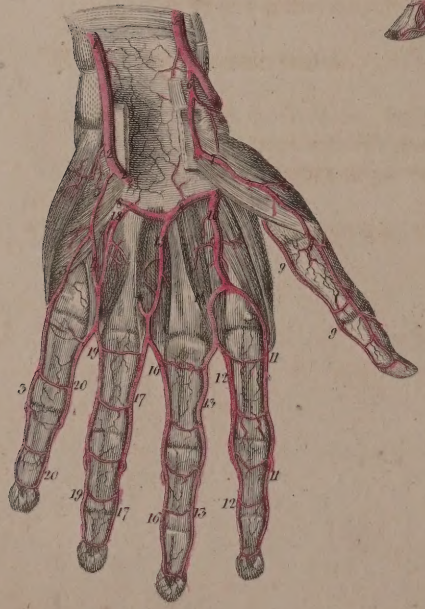
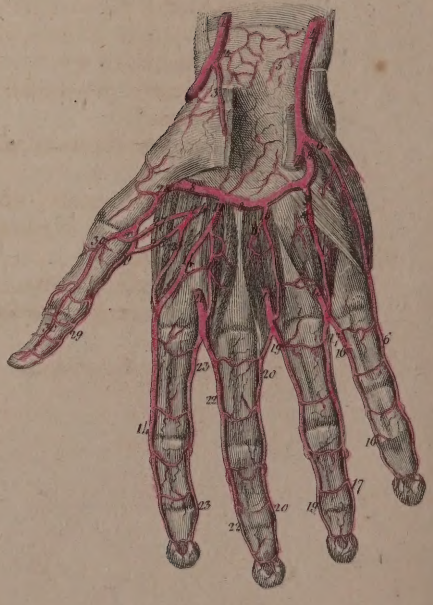


Fig. 6.



E. Mitchell Sculpt

PLATE XVIII.

Figure I.

This shows a right hand, in which the superficial volar arch is composed of the radial and ulnar arteries. This disposition is frequent.

1. Radial artery.
2. Superficial volar branch.
3. Twig to the opponens, abductor, and flexor brevis, pollicis.
4. Anastomosis of the superficial volar branch, with the ulnar artery.
5. Ulnar artery.
6. Deep volar branch of the ulnar.
7. Superficial volar arch.
8. First digital artery.
9, 9. Anterior digito-ulnar artery of the little finger.
10, 10. Small trunk, which divides into
11, 11. The anterior digito-radial artery of the little finger, and
12, 12. Anterior digito-ulnar artery of the ring finger.
13. Second digital artery, which divides into
14, 14. The anterior digito-radial artery of the ring finger, and
15, 15. Anterior digito-ulnar artery of the middle finger.
16. Third digital artery, which divides into
17, 17. Anterior digito-radial artery of the middle finger, and
18, 18. Anterior digito-ulnar artery of the fore-finger.
19. Fourth digital artery, which divides into
20, 20. The anterior digito-radial artery, of the fore-finger, and
21. Arteria magna pollicis, which divides into
22, 22. The anterior digito-radial artery of the thumb, and
23, 23. Anterior digito-ulnar artery of the thumb.

Figure II.

The right hand of a man, in which a rare disposition of the arteries is observed.

1. Radial artery.
2, 2. Superficial volar artery from the radial.
3. Anastomosing twig, with the ulnar.
4, 4. Anterior digito-ulnar artery of the thumb.
5, 5. Anterior digito-radial artery of the fore-finger.
6, 6. Anterior digito-radial artery of the thumb, from the deep arch.
7. Ulnar artery.
8. Deep volar artery.
9, 9. Anterior digito-ulnar artery of the little finger.
10. Small trunk, which divides into
11, 11. Anterior digito-radial of the little finger, and
12, 12, Anterior digito-ulnar artery of the ring finger.
13. Twig anastomosing with the superficialis volæ of the radial.
14. First digital artery from the ulnar in the palm, which divides into
15, 15. Anterior digito-radial artery of the ring finger, and
16, 16. Anterior digito-ulnar artery of the middle finger.
17. Second digital artery from the ulnar in the palm, which divides into
18, 18. Anterior digito-radial artery of the middle finger, and
19, 19. Anterior digito-ulnar artery of the fore-finger.

Figure III.

The right hand of a woman, in which an unusual distribution of the arteries is seen.

1. Radial artery.
2. A very small superficial volar branch, which has no communication with the superficial palmar arch.
3. Anterior digito-radial artery of the thumb, from the deep arch.
4. Anterior digito-ulnar artery of the thumb, also from the deep arch.
5. Anastomosis between the deep and superficial palmar arches.
6. Ulnar artery.
7 Deep palmar artery.
8, 8. Superficial palmar arch.
9, 9, 9. Anterior digito-ulnar artery of the little finger.
10, Second anterior digital artery which divides into
11. The anterior digito-radial artery of the little finger, and
12, 12. Anterior digito-ulnar artery of the ring finger.
13. Third anterior digital artery, which divides into
14, 14. Anterior digito-radial artery of the ring finger, and
15, 15. Anterior digito-ulnar artery of the middle finger.
16. Fourth anterior digital artery, which anastomoses with a digital artery from the deep arch.
17. Anastomosis with the anterior digito-radial artery of the forefinger.
18. Digital artery from the deep arch, which divides into
19, 19. Anterior digito-radial artery of the middle finger, and
20, 20. Anterior digito-ulnar artery of the forefinger.
21, 21. Anterior digito-radial artery of the forefinger.
22. Ramus anastomoticus.

Figure IV.

Exhibits the right hand of a man in which a very rare variety is seen.

1. Radial artery.
2. Superficial volar artery, which has no connexion with the superficial palmar artery from the ulnar.
3, 3. Anterior digito radial artery of the thumb.
4. Small trunk of
5, 5. The anterior digito-ulnar artery of the thumb, and
6, 6. The anterior digito-radial of the fore-finger.
7, 7. Digital artery, which divides into
8, 8. The anterior digito-ulnar artery of the fore-finger, and
9, 9. The anterior digito-radial artery of the middle-finger.
10. Ulnar artery.
11. Deep palmar artery.
12. Superficial palmar artery flexuous.
13, 13. Anterior digito-ulnar artery of the little finger.
14. Digital artery, which divides into
15, 15. The anterior digito-radial artery of the little finger, and
16, 16. The anterior digito-ulnar artery of the ring finger.
17. Digital artery, which divides into
18, 18. The anterior digito-radial artery of the ring finger, and
19, 19. The anterior digito-ulnar artery of the middle finger.

Figure V.

Represents a left hand, in which the anterior digital arteries arise from the deep arch.

1. Ulnar artery.
2, 2. Superficial palmar branch, cut.
3, 3, 3. Anterior digito-ulnar artery of the little finger.
4. Communicating branch between the digital artery and deep arch.
5. Radial artery.
6. Superficialis volæ.
7, 7. Anterior digito-radial artery of the thumb.
8, 8, 8. Deep palmar arch.
9, 9. Anterior digito-ulnar artery of the thumb.
10. First anterior interosseal artery, which divides into
11, 11. Anterior digito-radial artery of the fore-finger,
12, 12. Anterior digito-ulnar artery of the fore-finger, and
13, 13. The anterior digito-radial artery of the middle finger.
14. Small digital artery from the superficial palmar arch, cut.
15. Second anterior interosseal artery.
* Digital artery from the superficial arch, cut.
16, 16. Anterior digito-ulnar artery of the middle finger.
17, 17. Anterior digito-radial artery of the ring-finger.

18. Third anterior interosseal artery, which divides into
19, 19. Anterior digito-ulnar artery of the ring-finger, and
20, 20. Anterior digito-radial artery of the little finger.

Figure VI.

Shows a right hand, in which the arteries are irregular.

1. Radial artery.
2. Carpal artery from the radial.
3. Superficialis volæ.
4. Ulnar artery.
5. Carpal artery from the ulnar.
6, 6. Anterior digito-ulnar artery of the little finger.
7. Superficial palmar branch, cut.
8, 8, 8. Deep volar arch.
9. First anterior interosseal artery, which joins the first anterior digital artery.
10. Second anterior interosseal artery joining the second anterior digital artery.
11, 11. Perforating branches.
12. Third anterior interosseal artery.
13. Communicating branch with the third digital artery.
14, 14. Anterior digito-radial artery of the fore-finger.
15. First anterior digital artery, cut, which divides into
16, 16. Anterior digito-radial artery of the little finger, and
17, 17. Anterior digito-ulnar artery of the ring-finger.
18. Second anterior digital artery, which divides into
19, 19. The anterior digito-radial artery of the ring finger, and
20, 20. Anterior digito-ulnar artery of the middle finger.
21. Third digital artery, which divides into
22, 22. The anterior digito-radial artery of the middle finger, and
23, 23. Anterior digito-ulnar artery of the fore-finger.
24. Anterior digital artery of the thumb from the superficial palmar arch.
25. Anastomosing branch with the anterior digito-radial artery of the fore-finger.
26. Communicating branch with the anterior digito-ulnar artery of the thumb.
27. Communicating branch with the anterior digito-radial artery of the thumb.
28. Arteria magna pollicis, which divides into
29, 29. Anterior digito-ulnar artery of the thumb, and
30, 30. Anterior digito-radial artery of the thumb

PL. XIX.

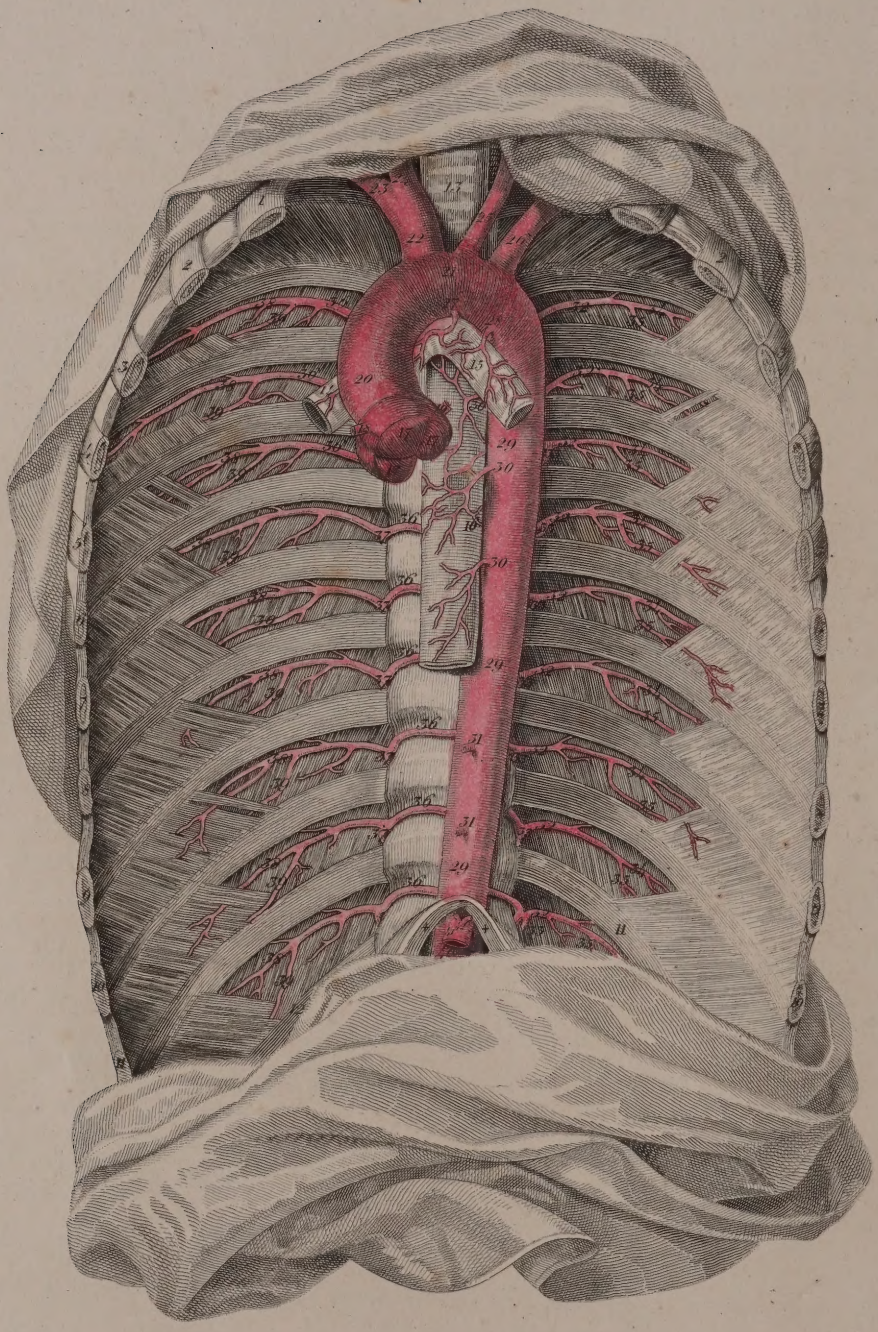


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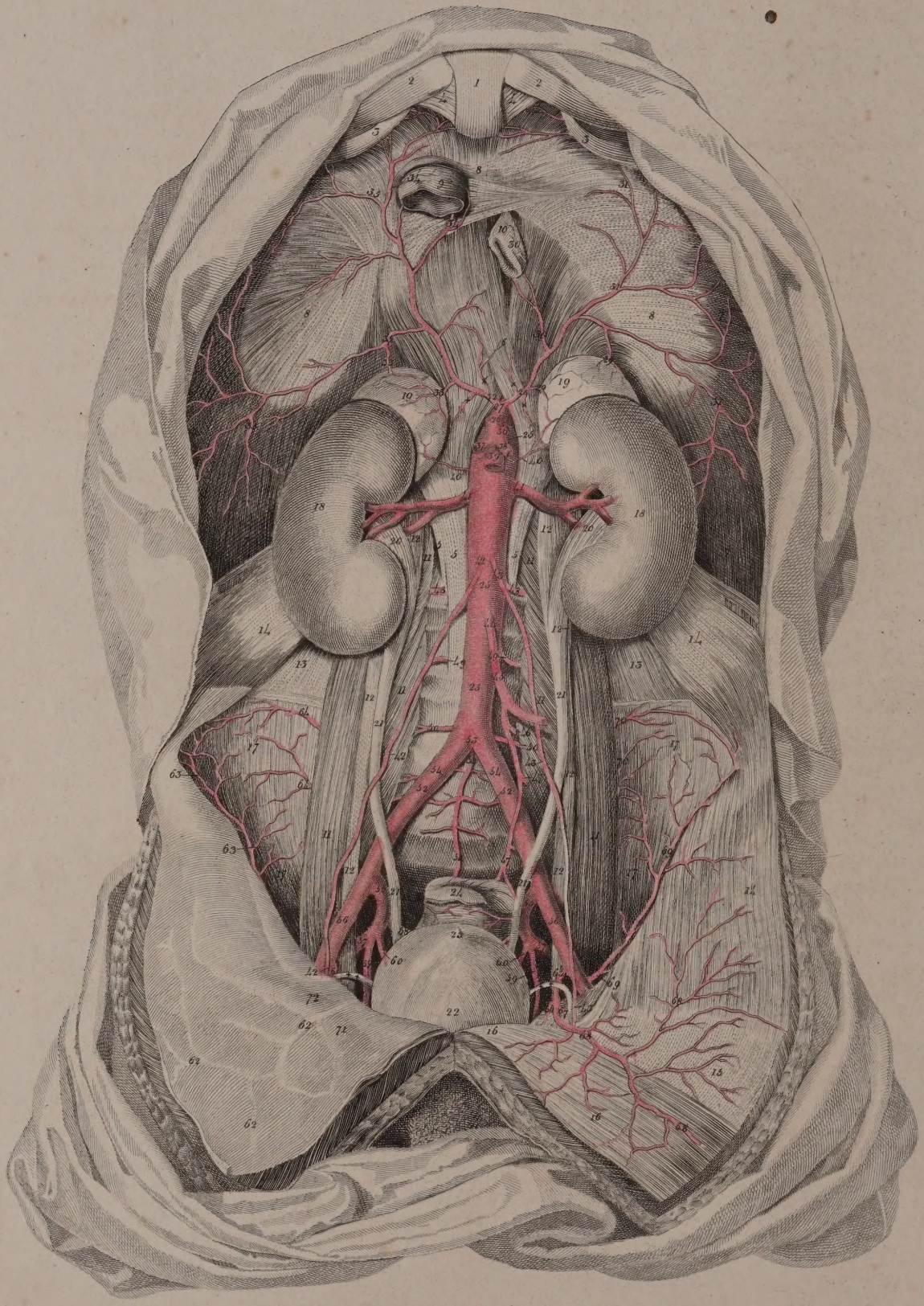
PLATE XIX.

Gives a Representation of the Thoracic Aorta.

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12. The ribs.
†† Portion of the diaphragm.
13. The trachea.
14. Right bronchus.
15. Left bronchus.
16. Œsophagus.
17, 17, 17. Semilunar valves of the aorta.
18. Origin of the right coronary artery of the heart.
19. Origin of the left coronary artery of the heart.
20. Ascending aorta.
21. Arch of the aorta.
22. Trunk of the arteria innominata.
23. Right subclavian.
24. The right carotid artery.
25. The left carotid artery.
26. Left subclavian artery.
27. Bronchial artery of the right side.
28. Left bronchial artery. (*a*)
29, 29, 29. Descending aorta.
30, 30, 30. Œsophageal arteries.
31, 31. Œsophageal arteries truncated.
32, 32, 32, 32, 32, 32, 32, 32, 32. Left inferior or aortic intercostal arteries.
33, 33, 33, 33, 33, 33. Posterior or dorsal branches.
34, 34, 34, 34, 34, 34, 34. Inferior costal branches.
35, 35, 35, 35, 35, 35, 35. Superior costal branches.
36, 36, 36, 36, 36, 36, 36, 36. Right aortic intercostal arteries.
37, 37, 37, 37, 37, 37. Dorsal branches.
38, 38, 38, 38, 38, 38, 38, 38, 38. Inferior costal branches.
39, 39, 39, 39, 39, 39. Superior costal branches,
40. Abdominal aorta.
41. Coeliac artery.
42. Trunk of the inferior phrenic arteries.

(*a*) It is quite evident that the bronchial arteries vary very much, and scarcely keep to any general rule.

PL. XX.



E. Mitchell sculp.

PLATE XX.

This shows the Abdominal Aorta and its Branches.

1. Ensiform process of the sternum.
2, 2. Cartilage of the seventh rib.
3, 3. Cartilage of the eighth rib.
4, 4. Costo-xiphoid ligaments.
5, 5, 5. Lumbar fasciculi of the diaphragm.
6, Union of the crura of the diaphragm.
7, 7, 7, 7. Costal fasciculi of this muscle.
8, 8, 8. Tendon of the diaphragm.
9, Foramen, through which the inferior vena cava passes.
10, Hiatus for the passage of the œsophagus.
11, 11. Psoæ magnæ muscles.
12, 12, 12, 12. Psoæ parvæ muscles.
13, 13. Quadrati lumborum muscles.
14, 14, 14, 14. Transversales muscles of the abdomen.
15. Membraneous tendon of the left transversalis muscle of the abdomen.
16, 16. Rectus abdominis of the left side.
17, 17, 17, 17. Iliaci interni muscles.
18, 18. Kidneys.
19, 19. Supra-renal glands.
20, 20. Pelves of the kidneys.
21, 21. Ureters.
22. Urinary bladder.
23. Urachus.
24. Rectum.
25, 25, 25. Abdominal aorta passing between the crura of the diaphragm.
26. Coeliac artery.
27. Inferior phrenic artery *(A. magna s. princeps.)*[a]
28. Left phrenic artery.
† † † † Twigs to the crura of the diaphragm.
29, 29. Superior supra-renal branches.
30, 30. Œsophageal branch.
31, 31, 31. Anterior, external, and posterior branches.
32. Right phrenic artery.
33, 33. Superior supra-renal branches of the right side.
34, 34. Twigs to the vena cava inferior, ascending into the thorax by the foramen in the cordiform tendon of the diaphragm.
35, 35, 35. Anterior, external, and posterior branches.
36. Arteria coronaria ventriculi, cut.
37. Hepatic artery, cut.
38. Splenic artery, cut.
39. Trunk of the superior mesenteric artery.
40, 40. Middle capsular arteries.[a]
41, 41. Renal arteries.[b]
42, 42, 42. Right spermatic artery.[c]
43, 43, 43. Left spermatic artery passing into the inguinal canal along with the vas deferens.
44. Inferior mesenteric artery.
45. Left superior colic artery.
46. Left inferior colic artery.
47. Superior or internal hæmorrhoidal artery.
48, 48. Second lumbar artery of each side.
49, 49. Third lumbar artery of each side.
50, 50. Fourth lumbar artery of each side.

---

a This artery presents many varieties which Haller (Icon. Anat. Fasc. 3. p. 53.) has well described. There are either two phrenic arteries or a single one. In twenty-one bodies, a single phrenic artery occurred five times, thrice from the aorta, immediately above the coeliac, and twice from the latter artery itself. Sixteen times there were two: the coeliac gave them both off six times; the aorta twice; twice the coeliac gave off the right, and the aorta the left; twice the coronaria ventriculi gave off the right, and the aorta the left; twice the aorta gave off the right, and the coeliac the left; once the renal gave off the right, and the aorta the left; lastly, there were once four arteries, two of which were given off by the aorta, and two by the coeliac. I here omit another observation, in which, besides two phrenics from the aorta, one came from the coeliac.

To these varieties, all of which I have seen, I may add a new one, viz. the phrenic artery formed a common trunk with the coronaria ventriculi which arose from the aorta.

a These capsular arteries very often arise from the renal.

b It is well known that the renal arteries vary very much.

c The spermatic arteries vary as to number and origin. Generally two spermatic arteries arise from the aorta, or one which afterwards divides into two. Not uncommonly the left spermatic comes off from the aorta higher than the right, and *vice versa*. One spermatic often arises from the renal or capsular artery, (Haller Icon. Anat. Fasc. 3, p. 60,) or from the Hypogastric, (Mayer Beschreibung der Blutgefässe, p. 180,) and the other from the aorta.

Sometimes there are two on one or both sides, (Haller, l. c. Morgagni de Sed. et Causs, Morbor. T. 2. p. 348; Hunter Medical Commentaries, p. 78; Pohl Obs. Angiol. p. 12; Nicolai de direct. vasor. § 17; Huber Observ. Anat. in Halleri Thes. Diss. vol. i. p. 307; Otto Seltene Beobacht. Zur Anatomie, p. 101.

51, 51. Arteria sacra media.
52, 52. Fifth lumbar artery.[a]
53. Abdominal aorta dividing into the common iliacs.
54, 54. Common iliac arteries.
55, 55. Hypogastric, or internal iliac arteries.
56, 56. External iliac arteries.
57, 57. Gluteal arteries.
58 Right sacro-lateral artery.
59, 59. Obturator arteries.
60, 60. Ischiatic arteries.
61, 61. Right epigastric artery.
62, 62, 62. Branches of this artery ascending behind the peritoneum.
63, 63. Right circumflex iliac artery.
64, 64. Twigs of the ilio-lumbar artery.
65. Left epigastric artery.
66. Twig to the inner surface of the os pubis.
67. Twig to the spermatic cord, forming the inferior spermatic artery.
68, 68, 68. Proper epigastric branches.
69, 69. Left circumflex iliac artery.
70, 70. Twigs of the ilio-lumbar artery anastomosing with the circumflex iliac artery.
71. Internal inguinal fossa.
72. External inguinal fossa.

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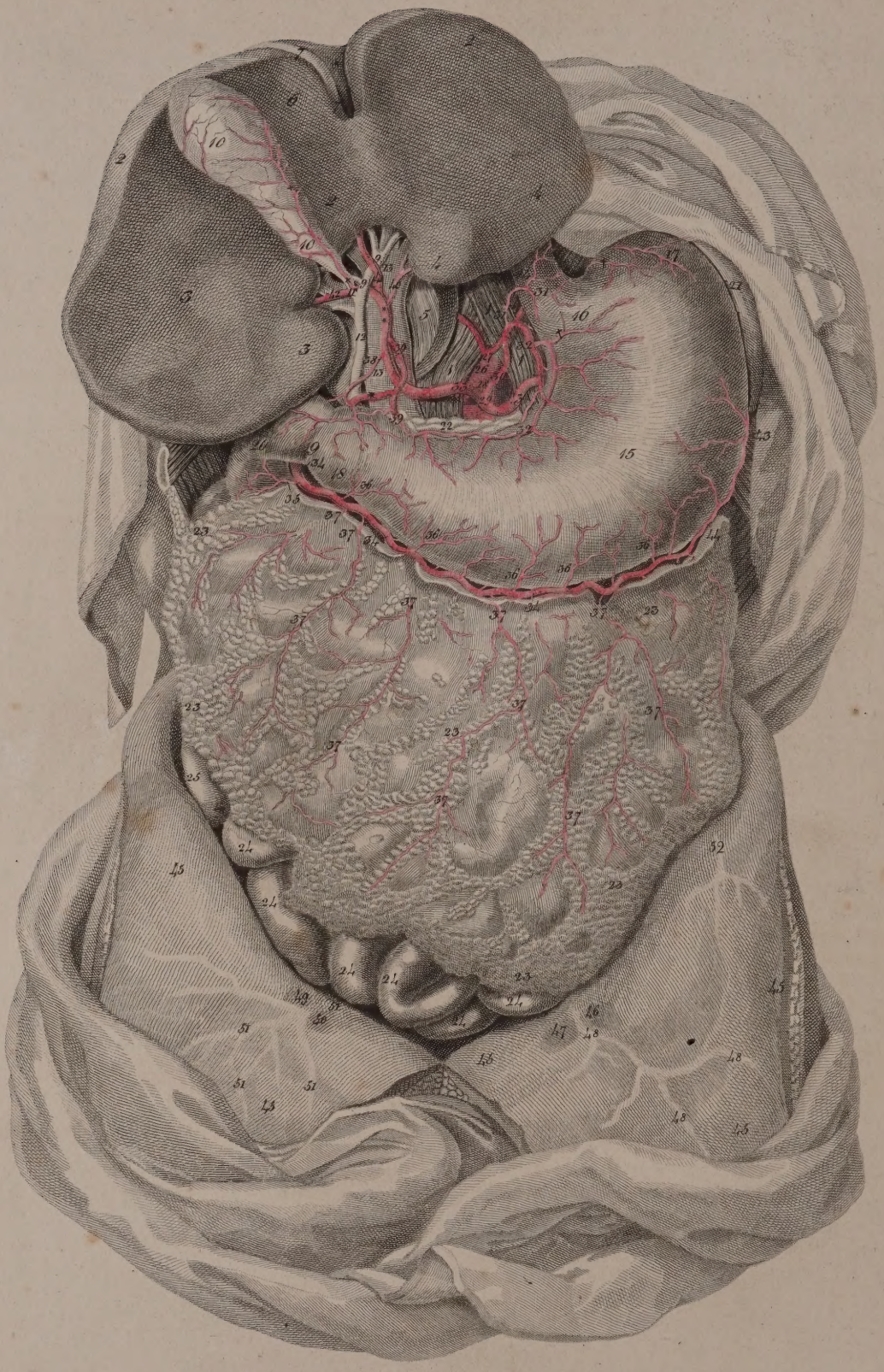
[a] This artery generally arises from the arteria sacra media, sometimes from the aorta, or common iliac.

PL.XXI.



E. Mitchell fculpt.

PLATE XXI.

This shows the Arteries of the Stomach and Liver.

1, 1, 1. Crura of the diaphragm.
2, 2. Liver drawn aside.
3, 3. Right lobe.
4, 4. Left lobe.
5. Lobulus Spigelii.
6. Lobulus quadratus.
7. Round ligament.
8. Suspensory ligament.
9, 9. Hepatic duct.
10, 10. Gall-bladder.
11. Cystic duct.
12. Ductus communis choledochus.
13. Vena portarum.
14. Oesophagus.
15. Stomach.
16. Cardia.
17. Great cul-de-sac of the stomach.
18. Small cul-de-sac of the stomach.
19. Pylorus.
20. Duodenum.
21. Spleen.
22. Pancreas.
23, 23, 23, 23, 23. Omentum majus.
24, 24, 24, 24, 24. Small intestines.
25. Cœcum.
26. Abdominal aorta.
27. Phrenic arteries arising from the aorta.
28. Cœliac artery.
29. The tripod of the cœliac artery.
30. Coronary artery of the stomach.
31. Inferior œsophageal artery.
† † Twigs to the cardia and the great cul-de-sac of the stomach.
32, 32. Anastomosing coronary branch.
33. Hepatic artery.[a]
* Gastro-duodenal artery.
34, 34, 34. Right gastro-epiploic artery.
35. A twig to the duodenum.
36, 36, 36, 36, 36. Gastric twigs.
37, 37, 37, 37. Omental branches.
38. A twig to the pylorus.
39, 39. Pyloric artery which anastomoses with the coronaria ventriculi.
* * Hepatic branch.
40. Left hepatic artery. [b]
41. Middle hepatic artery.
42. Right hepatic artery.
† † † Cystic artery.
43. Left gastro-epiploic artery.
44. Anastomosis between the right and left gastro-epiploic arteries.
45, 45, 45, 45. Peritoneum.
46. External inguinal fossa.
47. Internal inguinal fossa.
48, 48, 48. Left epigastric artery covered by the peritoneum.
49. External inguinal fossa of the right side.
50. Internal inguinal fossa of the same side.
51, 51, 51. Right epigastric artery.
52. Twig of the circumflex iliac artery.

---

[a] It seldom comes off from the aorta separately (Sandifort Obs. Anat. Path. L. 2. p. 126.) The hepatic artery is sometimes a branch of the superior mesenteric artery. Lastly, there may be several hepatic arteries, one from the usual place, the other from the coronaria ventriculi or superior mesenteric artery.

[b] This very frequently arises from the coronaria ventriculi.

PL.XXII.

Fig. 1.

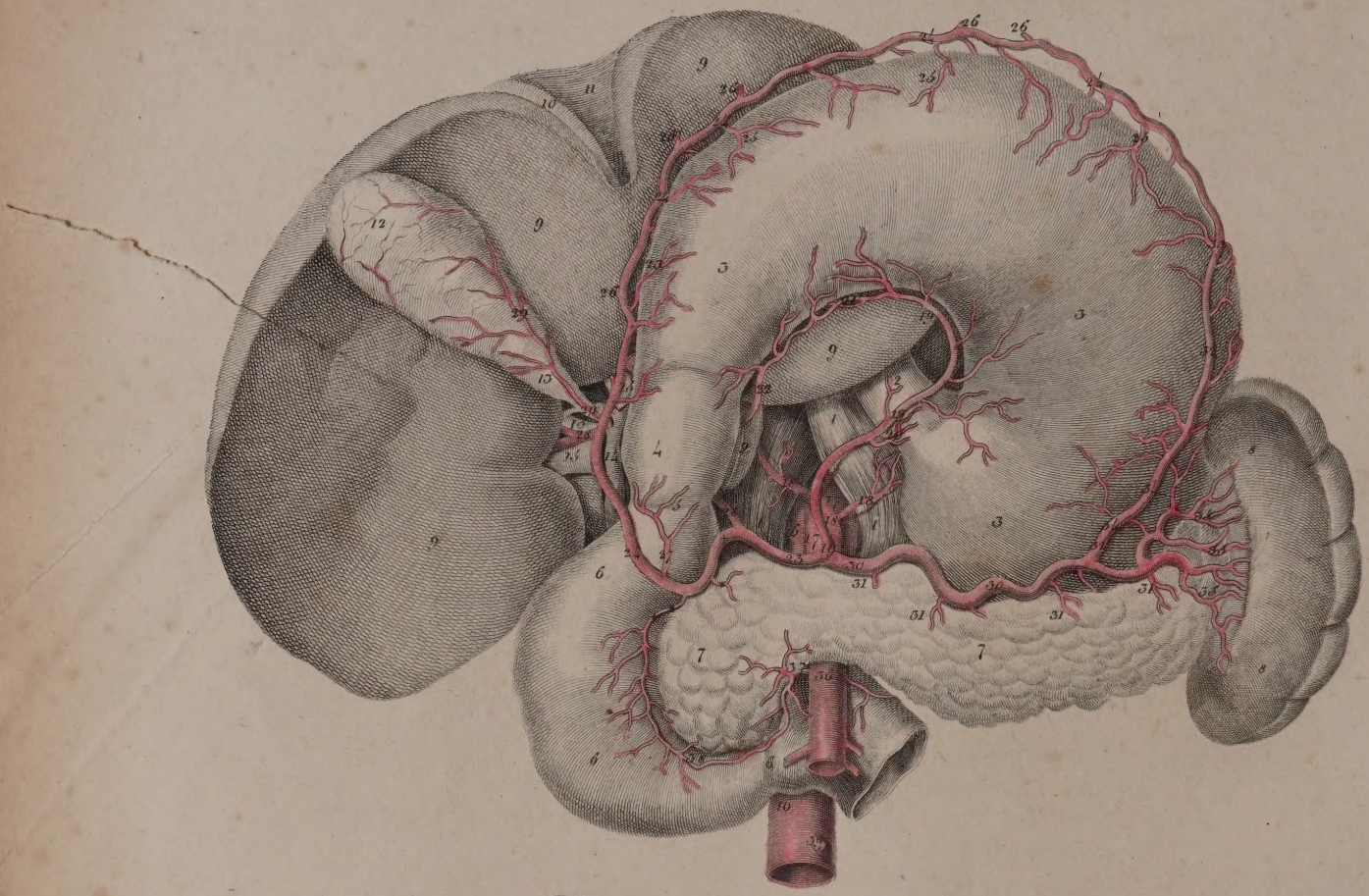


Fig. 2.

E. Mitchell fecit.

PLATE XXII.

FIGURE I.

Represents the arteries of the stomach, duodenum, pancreas, and spleen, The stomach is drawn aside.

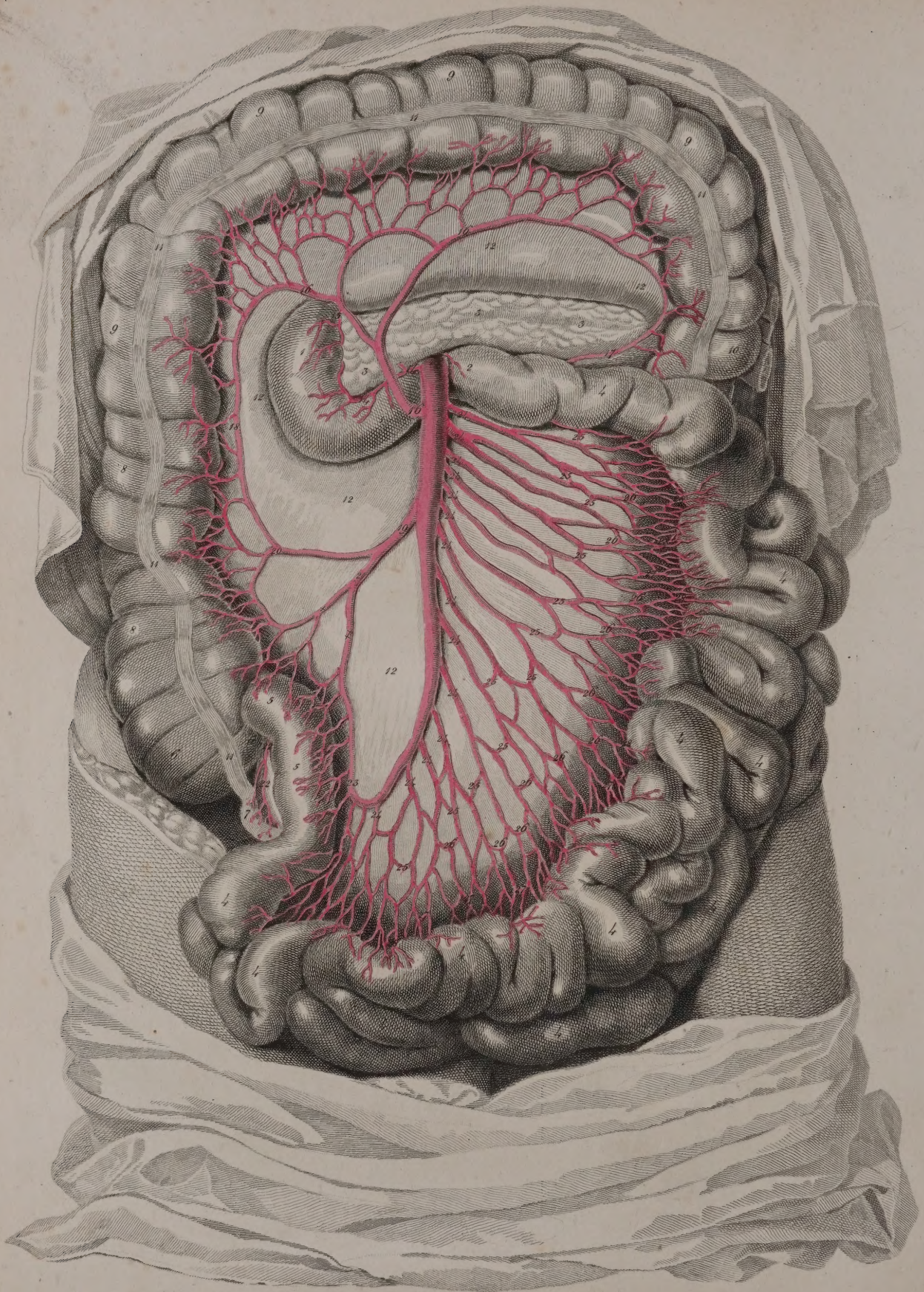
1, 1, 1. Crura of the diaphragm.
2. Œsophagus.
3, 3, 3, 3. Posterior surface of the stomach reflected.
4. Small cul-de-sac of the stomach.
5. Pylorus.
6, 6, 6. Duodenum.
7, 7. Pancreas.
8, 8. Spleen.
9, 9, 9. Inferior surface of the liver drawn aside.
10. Round ligament of the liver.
11. Suspensory ligament.
12. Gall-bladder.
13. Neck of the gall-bladder.
14. Ductus communis choledochus.
15, 15, 15. Vena portarum.
16, 16. Abdominal aorta.
17, 17. Cœliac artery.
18, 18, 18. Inferior phrenic arteries.
19, 19, 19. Coronary artery of the Stomach.
20. Œsophageal branch.
21. Anastomosis of the coronaria ventriculi with the pyloric artery.
22. Pyloric artery from the hepatic.
23. Hepatic artery.
† Gastro-duodenal artery.
* Pancreatic branch.
* * Superior pancreatico-duodenal artery.
24, 24, 24, 24. Right gastro-epiploic artery.
25, 25, 25. Gastric branches.
26, 26, 26, 26, 26. Omental branches, cut.
27. Inferior pyloric artery.
28. Hepatic branch.
29. Cystic artery.
30, 30. Splenic artery.
31, 31, 31, 31. Superior or middle pancreatic branches.
32, 32. Left gastro-epiploic artery.
33. Anastomosis between the left and right gastro-epiploic arteries.
34, 34. Vasa brevia.
35, 35, 35. Proper splenic branches.
36. Superior mesenteric artery.
37. Inferior pancreatico-duodenal artery.
38. Anastomosis of this artery with the superior pancreatico-duodenal.
39. Inferior mesenteric artery.

FIGURE II.

Exhibits the distribution of the arteries on the posterior surface of the stomach.

1. Oesophagus.
2. Cardia.
3. Fundus, or great cul-de-sac of the stomach.
4, 4. Smaller curvature.
5, 5, 5, 5. Greater curvature.
6. Small cul-de-sac of the stomach.
7. Pylorus.
8. Duodenum.
9, 9. Coronary artery of the stomach.
10. Pyloric artery.
11. Anastomosis between these arteries.
12, 12, 12, 12. Posterior gastric branches.
13, 13, 13, 13. Anterior gastric branches.
14, 14, 14, 14. Right gastro-epiploic artery.
15, 15, 15. Left gastro-epiploic artery.
16. Anastomosis of these arteries.
17, 17, 17, 17, 17. Omental branches cut.
18, 18, 18, 18, 18. Posterior gastric branches.
19, 19, 19, 19, 19. Great vascular net-work, which is formed by the anastomosis of these arteries with the superior.
20. 20. Vasa brevia from the splenic.

PL. XXIII.



P. Mitchell sculpt

PLATE XXIII.

Shows the Superior Mesenteric Artery.

1, 1. The duodenum.
2. Beginning of the jejunum.
3, 3. Pancreas.
4, 4, 4, 4, 4, 4, 4, 4, 4, 4. Small intestines.
5, 5. Termination of the ileum in
6, 6. The cœcum.
7. Vermiform appendix.
8, 8. Ascending colon.
9, 9, 9, 9. Transverse colon.
10. Descending colon.
11, 11, 11, 11, 11. Anterior bundle of longitudinal fibres,
12, 12, 12, 12, 12. Posterior lamina of the peritoneum.
13. Superior mesenteric artery.[a]
14, 14. Inferior pancreatico-duodenal artery.
15. Superior pancreatico-duodenal artery.
16, 16, 16. Middle colic artery.
17. Anastomosis of this artery with the left colic.
18. Anastomosis with the right colic artery.
19. Trunk of the right colic and ileo-colic arteries.
20. Right colic artery.
21. Ileo-colic artery.
† Cœcal artery.
22, 22, 22. Artery of the vermiform appendix.
† † Branch to the termination of the small intestines.
23. Anastomosis of the ileo-colic artery with the intestinal artery.
24, 24, 24, 24, 24, 24, 24, 24, 24, 24, 24, 24, 24, 24. Intestinal arteries.
25, 25, 25, 25, 25, 25, 25, 25, 25, 25, 25, 25, 25. Anastomoses of these arteries of the first order.
26, 26, 26, 26, 26, 26, 26, 26, 26, 26, 26. Anastomoses of the second order.
27, 27, 27, 27, 27, 27, 27, 27, 27, 27. Anastomoses of the third order.
28, 28, 28, 28, 28, 28, 28. Intestinal twigs.

[a] This rarely forms a common trunk with the cœliac artery. Haller (Icon. Anat. Fasc. viii. p. 35. No. 11.) once saw this disposition, which Galen, Riolan and others have described as regular.

PL.XXIV.

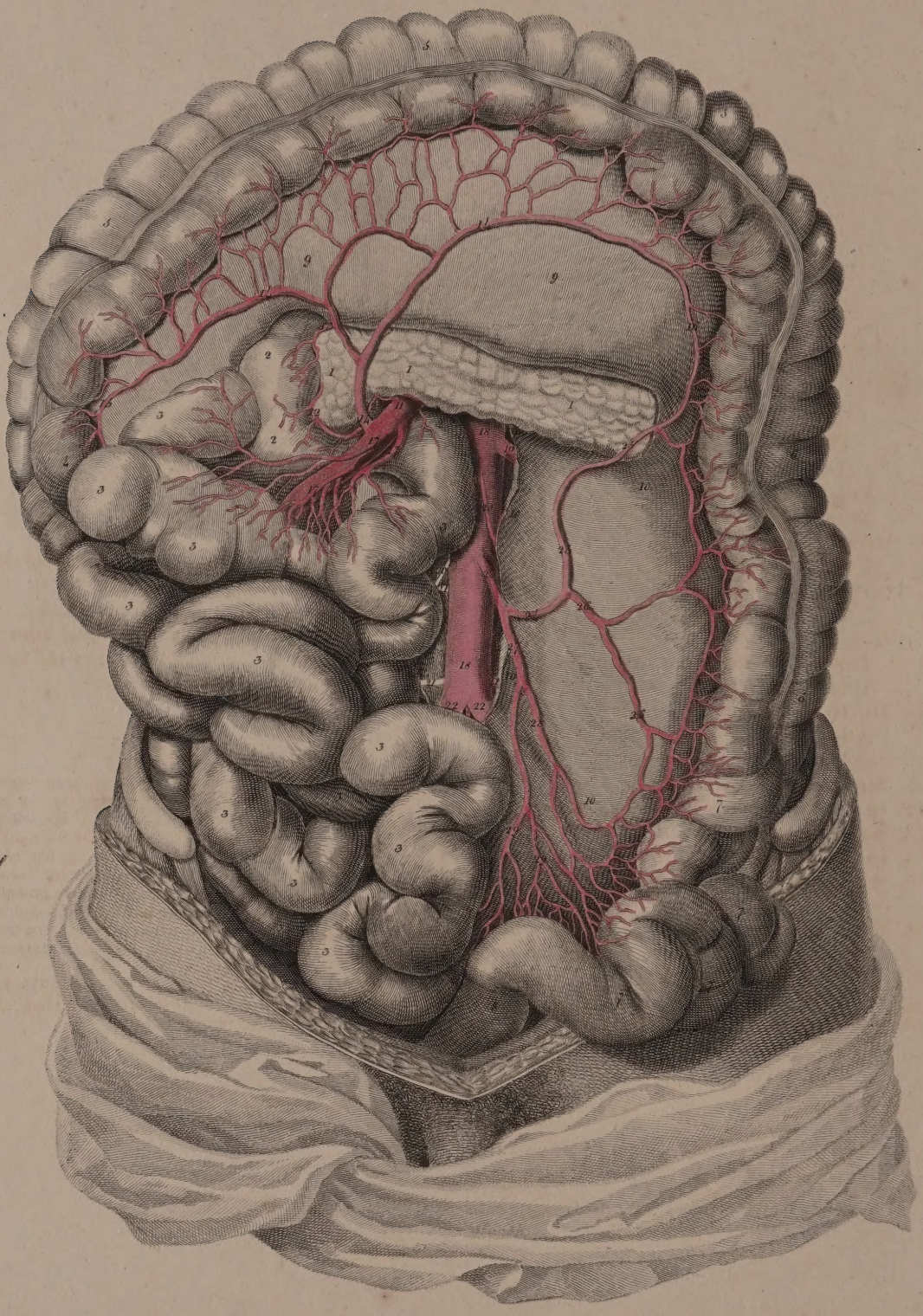


PLATE XXIV.

Exhibits the Inferior Mesenteric Artery.

1, 1, 1. Pancreas.
2, 2, 2. Duodenum.
3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3. Small intestines.
4. Ascending colon.
5, 5, 5. Transverse colon.
6, 6. Descending colon.
7, 7, 7, 7, 7. Sigmoid flexure of the colon.
8. Rectum.
9, 9. Lamina of the peritoneum composing the transverse mesocolon.
10, 10, 10, 10. Posterior lamina of the peritoneum which forms the descending mesocolon.
11. Superior mesenteric artery.
12, 12. Inferior pancreatico-duodenal artery.
13. Superior pancreatico-duodenal artery.
14, 14, 14. Middle colic artery.
15. Anastomosing branch with the right colic artery.
16. Great anastomosing branch with the left colic artery.
17, 17, 17. Intestinal branches.
18, 18. Abdominal aorta.
19. Left renal artery.
20, 20. Spermatic arteries.
21, 21, 21. Lumbar arteries.
22, 22. Iliac arteries.
23. Inferior mesenteric artery.[a]
24. Left colic artery.
25, 25. Ascending or great anastomosing branch with the middle colic.[b]
26, 26. Branch to the descending colon.
27. Internal or superior hæmorrhoidal artery.
28. Branch to the sigmoid flexure of the colon.
29, 29. Branches to the rectum.

---

[a] Petsche (Sylloge observationum anatomicarum selectarum §. 76.) mentions a rare variety in the origin of the inferior mesenteric artery. In a preparation in which the left kidney was wanting, the aorta, after having given off the right renal artery, divided into two equal branches, from the left of which the inferior mesenteric artery arose, below this these two branches communicated together by another cross branch.

Fleischmann (Leichen-Oeffnungen, S. 239.) found in the body of an infant no inferior mesenteric artery arising from the aorta; the left colon and the rectum received branches from the superior mesenteric artery.

[b] Vicq-d'Azyr (Mém. de l' Ac. des Sc. Ann. 1776. p. 702.) saw the anastomosis between the superior mesenteric and inferior mesenteric arteries entirely wanting.

PL.XXV.

Fig 1.

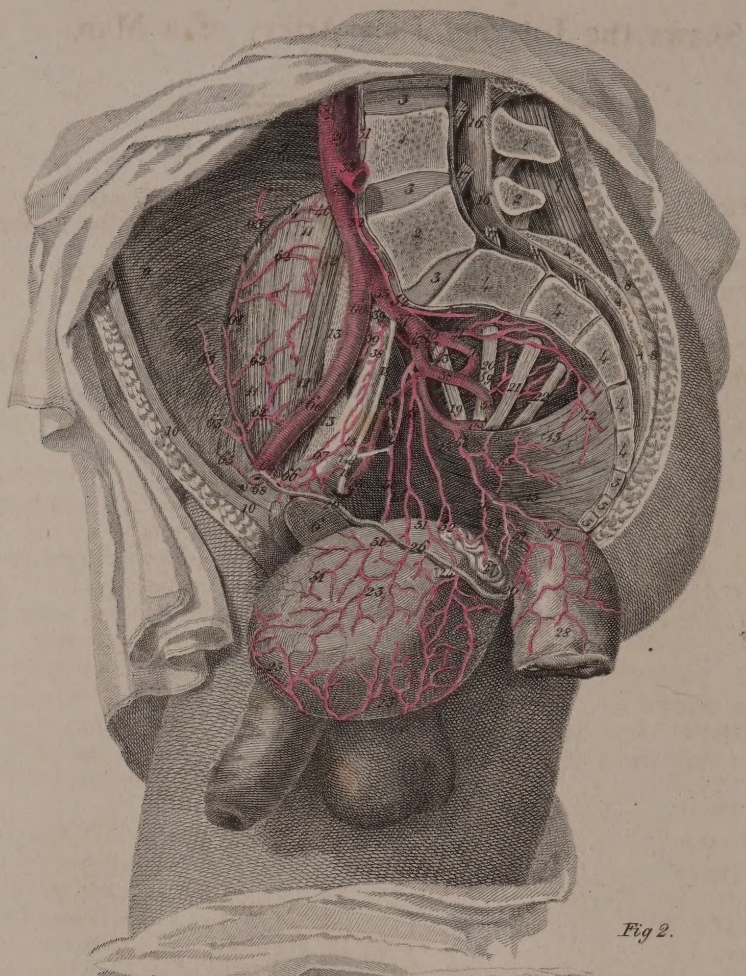


Fig 2.

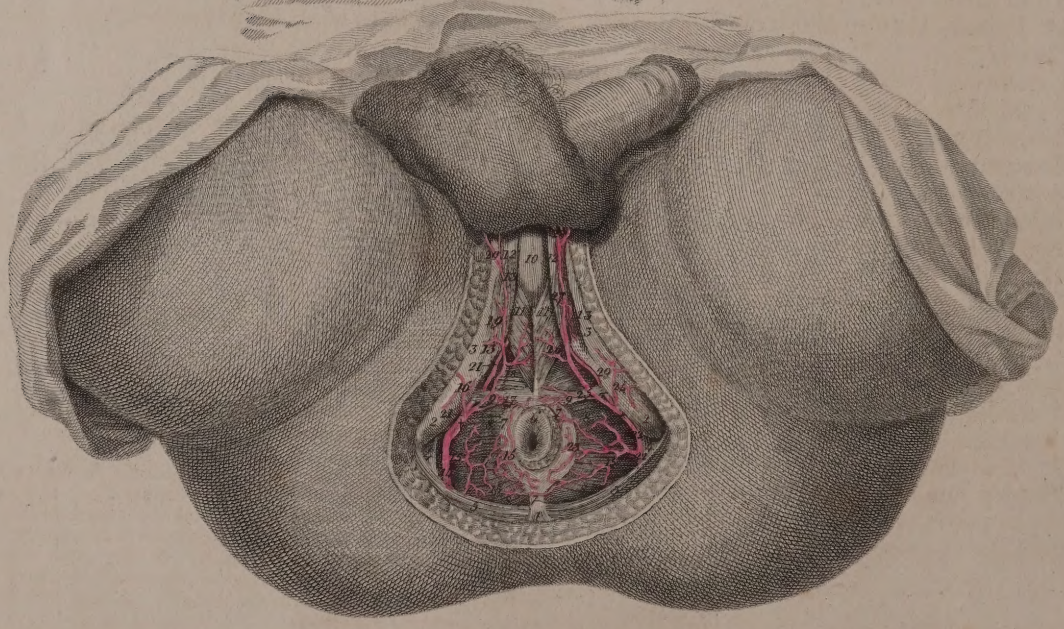


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PLATE XXV.

Shows the Internal Iliac Artery of a Man.

Figure I.

Exhibits the pelvis cut perpendicularly, in which the branches of the internal iliac artery are seen.

1, 1. Fourth lumbar vertebra.
2, 2. Fifth lumbar vertebra.
3, 3, 3. Intervertebral cartilages.
4, 4, 4, 4, 4, 4, 4. Sacrum.
5, 5, 5. Ossa coccygis.
6. Symphysis of the bones of the pubes.
7. Longissimus dorsi muscle.
8, 8. Gluteus maximus muscle.
9, 9, 9. Transversalis abdominis muscle.
10, 10, 10. Rectus abdominis muscle.
11, 11. Iliacus internus muscle.
12, 12. Psoas magnus.
13, 13. Tendon of the psoas parvus.
14, 14, 14. Pyriform muscle.
15, 15, 15, 15. Levator ani muscle.
16, 16, 16. Fibrous membrane of the spinal marrow.
17, 17, 17, 17, 17. Lumbar and sacral nerves.
18, 18. Obturator nerve.
19. Fifth lumbar nerve.
20. First sacral nerve.
21. Second sacral nerve.
22. Third sacral nerve.
23, 23. Urinary bladder drawn out of the pelvis.
24. Ureter.
25. Urachus.
26, 26, 26. Vas deferens.
27. Vesicula seminalis.
28. Rectum.
29. Aorta.
30. Inferior mesenteric artery.
31. Fourth lumbar artery.
32, 32. Middle sacral artery.
33. Left common iliac artery cut.
34. Right common iliac artery.
35. Internal iliac artery, which generally divides into an anterior and a posterior trunk.
36. Posterior trunk, which gives off the posterior branches.
37, 37. Ileo-lumbar artery.[a]
38. Branch running along the linea innominata of the pelvis, and inosculating with a branch from the epigastric artery.
39, 39. Twigs to the Psoas magnus.
40. Anastomosis of the ileo-lumbar artery with the circumflex iliac.
41, 41. Sacro-lateral artery.[b]
42. Twig to the levator ani.
43, 43, 43. Obturator artery.[c]
44, 44. Twig perforating the levator ani, and going to the obturator internus.
45. Twig anastomosing with the epigastric artery.
46. Gluteal artery.
47. Anterior trunk of the internal iliac, which gives off the anterior branches.
48, 48. Umbilical artery.
49. Part of this artery changed into a ligament.
50. Superior vesical artery.
51, 51, 51, 51, 51. Inferior vesical artery.[d]
52. Branch to the seminal vesicle.
53, 53. Internal or common pudic artery.
54 Middle hæmorrhoidal artery.[e]
55. Twig to the levator ani.
56. Twig to the vesicula seminalis.
57, 57. Branches distributed to the rectum.
58, 58. Ischiatic artery.
59. Twig to the pyramidalis muscle.
60, 60. External iliac artery.
61, 61. Circumflex iliac artery.
62, 62, 62. Twigs to the iliacus internus muscle.
63, 63, 63. Twigs to the abdominal muscles.
64. Anastomosis of this artery with the ileo-lumbar.
65. 65. Epigastric artery.
66. Obturator twig.
67. Union of this twig with the obturator artery.
68. Branch to the spermatic cord.

Figure II.

Shows the course of the common pudic artery.

1. Coccyx.
2, 2. Ischiatic tuberosities.

---

[a] This artery sometimes arises from the common iliac, or from the external iliac, or from the gluteal, seldom from the fourth lumbar or middle sacral. There are often two smaller ileo-lumbars present.

[b] Two are very often present, one of which comes from the internal iliac, the other from the gluteal, or ileo-lumbar or ischiatic.

[c] The origin of this artery varies very much. It frequently arises from the anterior trunk of the internal iliac; not unfrequently from the external iliac, or from the epigastric artery. Another plate exhibits the principal varieties of this artery.

[d] This artery varies as to its origin. It very often comes from the anterior trunk of the internal iliac artery, or from the common pudic artery, or from the ischiatic, or lastly from the middle hæmorrhoidal artery.

[e] This generally comes from the pudic artery, sometimes however from the anterior trunk of the internal iliac, or from the ischiatic, or from the sacro-lateral.

3, 3. Ascending rami of the ossa ischia.
4, 4. Great sacro-sciatic ligaments.
5, 5. Glutei maximi muscles.
6. Anus.
7, 7, 7. External sphincter of the anus.
8, 8, 8, 8. Levatores ani.
9, 9. Transverse muscles of the perineum.
10. Urethra.
11, 11. Acceleratores urinæ muscles
12, 12. Crura penis.
13, 13. Erector muscles of the penis.
14. Right common pudic artery.
15, 15, 15. External hæmorrhoidal artery.
† Superficialis perinei.
16. Twig descending to the tuberosity of the ischium.
17. Proper perineal twig.
18. Twig going to the accelerator urinæ.
19. Twigs sent to the erector penis.
20. Posterior scrotal artery.
21, 21. Deep branch of the common pudic artery.
22, 22. Left common pudic artery.
23, 23. External hæmorrhoidal artery.
* Superficialis perinei.
24. Ischiatic twig.
25. Proper perineal twig.
26. Twig to the accelerator urinæ muscle.
27. Twigs to the erector penis.
28. Posterior scrotal artery.

PLATE XXVI.

Exhibits the Course of the Internal Iliac Artery in the Female.

Figure I.

Shows the internal iliac artery in the female pelvis which is cut perpendicularly.

1. Third lumbar vertebra.
2. Fourth lumbar vertebra.
3. Fifth lumbar vertebra.
4, 4, 4. Intervertebral cartilages.
5, 5, 5. Sacrum.
6, 6. Ossa coccygis.
† Horizontal ramus of the pubes.
7. Symphysis pubis.
8, 8. Longissimus dorsi muscle.
9, 9. Left gluteus maximus muscle, cut.
10, 10, 10, 10. Transversalis abdominis.
11. Internal aperture of the inguinal canal.
12. Psoas magnus muscle.
13. Iliacus internus muscle.
14. Obturator internus muscle.
15. Pyriform muscle.
16, 16. Portion of the levator ani.
17, 17. Obturator nerve.
18. Fifth lumbar nerve.
19. First sacral nerve.
20 Second sacral nerve.
21. Third sacral nerve.
22. Urinary bladder drawndown.
23. Urachus.
24. Vagina.
25, 25. Uterus drawn aside.
26, 26, 26. Round ligament of the uterus.
27, 27. Fallopian tube.
28. Fimbriated extremity of the tube.
29. Ovary covered by the broad ligament.
30, 30. Rectum.
31. Aorta.
32. Inferior mesenteric artery.
33. Left common iliac artery.
34, 34. Third and fourth lumbar arteries.
35, 35, 35. Middle sacral artery.
36. Fifth lumbar artery.
37, 37. Right common iliac artery.
38. Internal iliac artery.
39, 39. Sacro-lateral artery.
40. Ileo-lumbar artery.
41. Twig to the psoas magnus.
42, 42. Twigs to the iliacus internus muscle.
43, 43. Obturator artery.
44, 44. Twigs to the obturator internus muscle.
45. Twig anastomosing with the epigastric artery.
46. Gluteal artery.
47, 47. Umbilical artery.
48. Part of the umbilical artery changed into ligament.
49, 49, 49, 49, 49. Vesical arteries.
50, 50. Uterine artery.[a]
51, 51, 51. Vaginal artery.
52, 52. Branch to the uterus.
53, 53. Common pudic artery.
54, 54. Middle hæmorrhoidal artery.[b]
55, 55. Twigs to the levator ani.
56, 56. Ischiatic artery.
57, 57. Twigs to the anterior surface of the sacrum and sacro-sciatic ligaments.
58, 58. External iliac artery.
59, 59. Circumflex iliac artery.
60, 60. Twigs to the iliacus internus muscle.
61. Anastomosis of this artery with the ileo-lumbar.
62, 62. Epigastric artery.
63. Twig to the inner surface of the pubes.
64. Obturator twig.
65. Branch to the round ligament of the uterus.

Figure II.

Shows the course of the common pudic artery.

1. Apex of the coccyx.
2, 2. Tuberosities of the ischia.
3. Mons veneris.
4, 4. Labia majora.
5. Clitoris.
6. Prepuce of the clitoris.
7, 7. Nymphæ.
8. Orifice of the Urethra.
9. Entrance of the Vagina.
10. Anus.
11. External sphincter of the anus.
12, 12, 12, 12. Levatores ani.
13. Anterior transversalis perinei muscle.
14. Posterior transversalis perinei.
15, 15. Constrictor vaginæ
16, 16. Erectores clitoridis
17, 17. Glutei maximi muscles.
18, 18. Internal obturator muscles.
19, 19. Right pudic artery.
20, 20. External hæmorrhoidal artery.
21. Twig to the tuberosity of the ischium.
22, 22. Perineal artery.
23, 23. Posterior artery of the labium pudendi.
24. Artery of the clitoris.
25. Left pudic artery.
26, 26, 26. External hæmorrhoidal branches.
27, 27. Branches to the perineum.
28. Twigs to the labium majus.
29. Artery of the clitoris.

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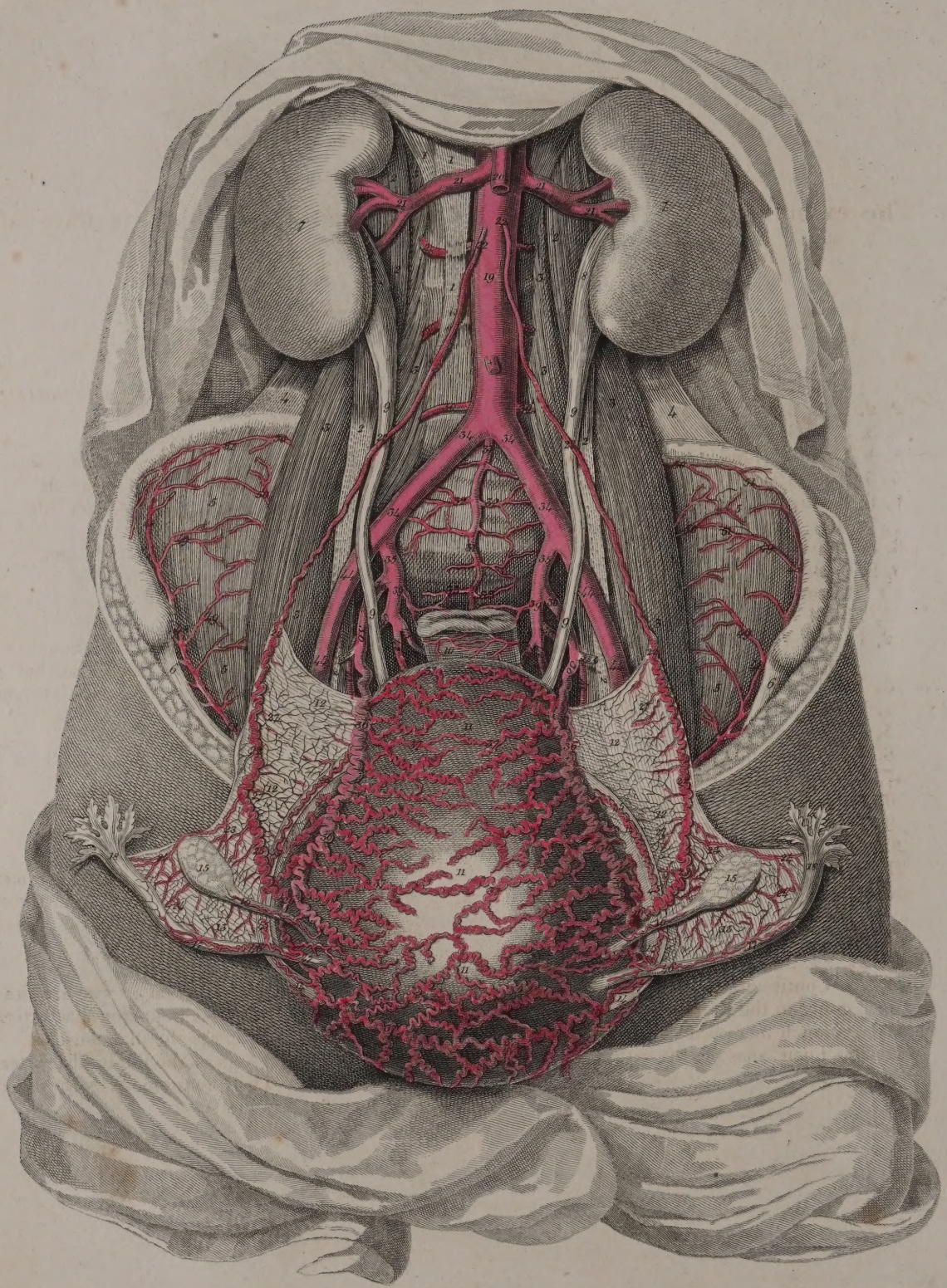
a This often forms a common trunk either with the umbilical artery or with the middle hæmorrhoidal.

b This sometimes arises as a peculiar branch from the internal iliac artery; or it comes from the ischiatic artery.

PL. XXVII.



E. Mitchell Sculpt.

PLATE XXVII.

This exhibits the arteries of the uterus in a woman, who died six days after parturition.

1, 1, 1, 1. Crura of the Diaphragm.
2, 2, 2, 2, 2, 2, 2. Psoæ parvæ muscles.
3, 3, 3, 3, 3, 3, 3. Psoæ magnæ muscles.
4, 4. Quadrati lumborum muscles.
5, 5, 5, 5. Iliaci interni muscles.
6, 6, 6. Ligaments of Poupart.
7, 7. The kidneys.
8, 8. Pelves of the kidneys.
9, 9, 9, 9. Ureters.
10. Rectum.
11, 11, 11. Uterus drawn forwards.
12, 12, 12, 12. Lamina of the broad ligaments of the uterus.
13, 13. Ligaments of the Fallopian tubes.
14, 14, 14, 14. Round ligaments of the uterus.
15, 15. Ovaries.
16, 16. Ligaments of the ovaries.
17, 17. Fallopian tubes.
18, 18. Fimbriated extremities of the tubes.
19, 19. Abdominal aorta.
20. Superior mesenteric artery.
21, 21, 21, 21. Renal arteries.
22, 22, 22, 22, 22, 22, 22, 22. Spermatic arteries.
23, 23. Branches sent to the ovaries.
24, 24, 24, 24. Branches to the Fallopian tubes.
25, 25. Continuations of the spermatic arteries, going to the uterus, the diameter of which is much increased during pregnancy.
26, 26. Their anastomosis with the uterine arteries.
27, 27, 27, 27. Twigs to the broad ligaments of the uterus.
† Inferior mesenteric artery.
28, 28. Second lumbar artery of each side.
29, 29. Third lumbar artery of each side.
30, 30. Fourth lumbar artery of each side.
31, 31. Middle sacral artery.
32, 32. Fifth lumbar artery of each side.
33, 33. Sacral branches.
34, 34, 34, 34. Common iliac arteries.
35, 35. Internal iliac arteries.
36, 36, 36, 36, 36, 36. Uterine arteries.
37, 37, 37, 37, 37, 37. Tortuous branches going to the posterior surface of the uterus.
38, 38. Umbilical arteries.
39, 39. Lateral sacral arteries.
40, 40. Gluteal arteries.
41, 41. Obturator arteries.
42, 42. Internal pudic arteries.
43, 43. Ischiatic arteries.
44, 44, 44, 44. External iliac arteries.
45, 45, 45, 45. Arteries of the round ligaments of the uterus which come off from the epigastric arteries. These arteries become larger during pregnancy.
46, 46. Twigs to the tubes.
47, 47. Anastomosis with the uterine arteries.
48, 48, 48, 48, 48, 48. Circumflex iliac arteries.
49, 49, 49, 49. Twigs to the iliac muscles.
50, 50, 50, 50. Twigs of the ilio-lumbar arteries.
51, 51, 51, 51. Their anastomosis with the circumflex arteries.

PL.XXVIII.

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PLATE XXVIII.

Shows the Course of the Internal Mammary and Epigastric Arteries. On the Left Side are seen the first Layer of Muscles and the Superficial Arteries. On the Right Side, the first and second Layers of Muscles are removed, so that the situation and Anastomosis of these Arteries are seen.

1, 1, 1. Sternum.
2. Ensiform process of the sternum.
3, 3, 3, 3. Linea alba.
4. Umbilicus.
5. Penis.

LEFT SIDE.

6, 6. Left clavicle.
7, 7, 7. Deltoid muscle.
8, 8, 8, 8, 8, 8, 8, 8. Pectoralis major.
9. Subclavius muscle.
10, 10. Latissimus dorsi.
11. Teres major.
12. Triceps extensor cubiti.
13. Coraco-brachialis.
14, 14, 14, 14. Serratus magnus.
15, 15, 15, 15, 15, 15, 15, 15, 15. External oblique muscle of the abdomen.
16. External abdominal ring.
17, 17, 17, 17, 17, 17. Fascia lata.
18, 18, 18. Superficial inguinal glands.
19, 19. Vas deferens.
20, 20, 20, 20, 20, 20. External perforating branches of the internal mammary artery which are distributed to the pectoralis major, mamma, and skin.
21, 21. Twig to the acromion.
22. Acromial thoracic artery.
23, 23, 23. Abdominal cutaneous twigs of the internal mammary artery.
24, 24, 24, 24, 24, 24. Cutaneous twigs of the epigastric artery.
25, 25, 25, 25, 25. Superficial epigastric artery.[a]
26. Twig to the superficial inguinal glands.
27. Branch of the external pudic artery.
28. Twig to the superficial inguinal glands.
29. Cutaneous twig.
30, 30. Spermatic artery.

[a] This artery always occurs, sometimes larger, sometimes smaller.

RIGHT SIDE.

31, 31. Right clavicle.
32. First rib.
33, 33. Second rib.
34, 34. Third rib.
35, 35. Fourth rib.
36, 36. Fifth rib.
37, 37. Sixth rib.
38, 38. Seventh rib.
39, 39. Eighth rib.
40, 40. Ninth rib.
41, 41. Tenth rib.
42, 42. Eleventh rib.
43. Subclavius muscle.
44. Insertion of the pectoralis minor.
45, 45. Serratus magnus.
46, 46, 46, 46, 46, 46, 46, 46. External intercostal muscles.
47, 47, 47, 47, 47, 47, 47, 47, 47. Internal intercostal muscles.
48, 48, 48, 48, 48, 48, 48, 48. Transversalis abdominis.
49. Pyramidalis.
50. Crest of the ileum.
51, 51. Poupart's ligament.
52. Gluteus medius.
53. Tensor vaginæ femoris.
54. Sartorius.
55. Rectus femoris.
56. Iliacus internus.
57. Psoas magnus.
58. Pectineus.
59, 59. Axillary vein.
60. Brachial plexus.
61. Femoral vein.
62. Deep inguinal glands.
63, 63. Vas deferens.
64, 64. Axillary artery.
65. Superior thoracic artery.
66. Acromial thoracic artery.
67. Third thoracic artery.

68. Anastomosis of this artery with the anterior intercostal branch of the internal mammary artery.
69, 69, 69. Long thoracic artery.
70, 70, 70, 70, 70, 70, 70. Internal mammary artery.
71, 71, 71, 71, 71, 71. External branches.
72, 72, 72, 72, 72, 72, 72, 72, 72, 72. Anterior intercostal arteries.
73, 73, 73, 73, 73, 73, 73, 73, 73, 73, 73, 73, 73. Posterior intercostal arteries anastomosing with the anterior.
74, 74. Epigastric branch of the internal mammary artery.
75, 75. Anastomosis of this with the epigastric artery.
76, 76. Femoral artery.
77, 77, 77, 77. Epigastric artery.
78. Twig to the spermatic cord, cut.
79, 79, 79, 79. Perforating branches, cut.
80, 80. Circumflex iliac artery.
81. Muscular branch.
82. Superficial epigastric artery.
83. External pudic artery.
84, 84. Spermatic artery.

PL. XXIX.

Fig. 1.

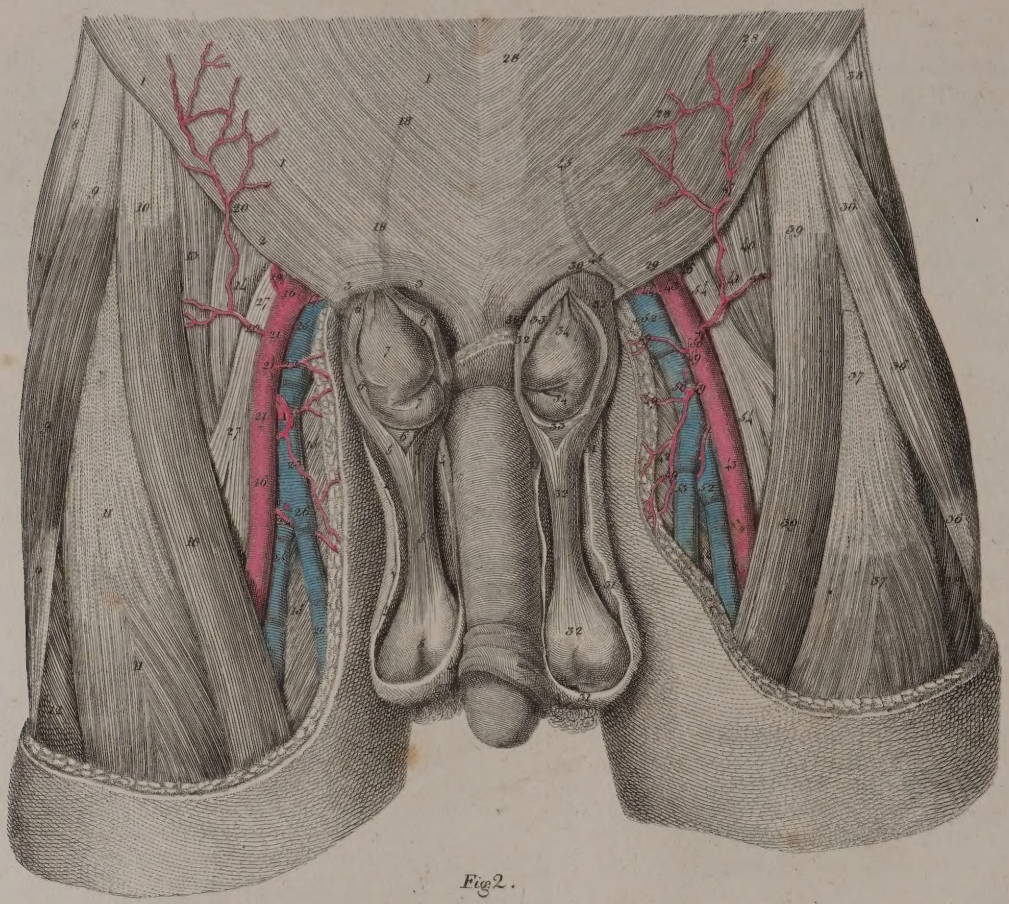

Fig. 2.

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PLATE XXIX.

This shows the situation of the epigastric arteries in the body of a man who had an oblique or external inguinal hernia on the right side, and a direct or internal inguinal hernia on the left.

Figure I.

Represents the herniæ from the outside.

Right Side

Shows the external inguinal hernia.

1, 1, 1. External oblique muscle of the abdomen.
2, 2. Poupart's ligament or crural arch.
3, 3. Abdominal ring expanded.
4, 4, 4, 4. Scrotum, cut.
5, 5, 5, 5. Common tunica vaginalis, with the cremaster muscle.
6, 6, 6, 6. The peritoneum, constituting the sac of the hernia, opened.
7, 7. Portion of the small intestine.
8, 8. Gluteus medius.
9, 9, 9. Tensor vaginæ femoris.
10, 10. Sartorius.
11, 11. Rectus femoris.
12. Vastus externus.
13. Iliacus internus.
14. Psoas magnus.
15, 15. Adductors.
16, 16. Femoral artery.
17. Epigastric artery ascending behind the hernia.
18, 18. Course of this artery towards the umbilicus, marked by dots.
19. Circumflex iliac artery.
20, 20. Superficial epigastric artery.
21, 21, 21. Twigs to the inguinal ganglia and skin, cut.
22. First external pudic artery.
23. Second external pudic artery.
24. Third external pudic artery
25, 25. Femoral vein.
26, 26. Great saphena vein.
27, 27. Femoral nerve.

Left Side

Exhibits the internal inguinal hernia.

28, 28, 28. External oblique muscle of the abdomen.
29, 29. Crural arch.
30, 30. Abdominal ring, dilated.
31, 31, 31. Scrotum, cut.
32, 32, 32, 32. Common tunica vaginalis and cremaster muscle.
33, 33, 33. Sac of the hernia, opened.
34, 34. Portion of the small intestine, protruded.
35, Gluteus Medius.
36, 36, 36. Tensor vaginæ femoris.
37, 37. Rectus femoris
38, 38. Vastus externus.
39. Sartorius.
40. Iliacus internus
41. Psoas magnus.
42 42, Adductors.
43, 43, Femoral artery
44, 44. Epigastric artery ascending before the neck of the hernia.
45, 45. Course of this artery.
46. Circumflex iliac artery.
47, 47. Superficial epigastric artery.
48. Twig to the sartorius.
49, 49, 49, 49, 49. External pudic arteries.
50, 50. Twigs to the skin and the inguinal glands, cut.
51. Twig to the adductor brevis.
52, 52. Femoral vein.
53. Great saphena vein.
54, 54. Femoral nerve.

Figure II.

This exhibits the epigastric arteries from the inside.

1, 1. Recti muscles of the abdomen.
2, 2, 2, 2. Transversales muscles of the abdomen.
3, 3, 3, 3. Iliac muscles.
4, 4, 4, 4, 4, 4. Psoæ magnæ.
5, 5, 5, 5. Psoæ parvæ.
6, 6. Quadrati lumborum.
7. Intestinum rectum.
8 Urinary bladder.
9. Aorta.
10, 10. Lumbar arteries.
+ Middle sacral artery.

External inguinal hernia and course of the arteries on the right side.

11, 11. Internal abdominal aperture.
12, 12. Peritoneum forming the hernial sac.
13. Entrance to the cavity of the hernial sac.
14. Vas deferens.
15, 15. Spermatic artery.
16. Spermatic veins.
17. Common iliac artery.
18. Hypogastric or internal iliac artery.
19. Obturator artery.
20, 20. External iliac artery.
21, 21. Epigastric artery running behind the hernial sac.
22. Branch running along the ramus of the os pubis.
23. Twig to the obturator hole.
24, 24. Twigs to the rectus abdominis
25, 25. Twigs to the transversales abdominis.
26, 26. Circumflex iliac artery.
27. Ileo-lumbar artery.
28, 28. Anastomosis with the circumflex iliac artery
29, 29. Twigs of the ileo-lumbar artery sent to the iliacus.

The internal inguinal hernia and course of the arteries on the left side.

30 Internal aperture of the inguinal canal.
31. 31. Spermatic artery.
32. Spermatic veins, or plexus pampiniformis.
33, 33. Vas deferens.
34. Aperture for the internal inguinal hernia which protrudes through a laceration in the tendinous lamina of the transversalis and obliquus internus muscles of the abdomen.
35, 35. Peritoneum forming the hernial sac.
36. Entrance to the hernial sac.
37. Common iliac artery.
38. Obturator artery.
39. Femoral artery.
40, 40. Epigastric artery which is situated on the outer and anterior part of the hernia.
41. External spermatic artery.
42. Branch running on the upper surface of the os pubis.
43. Twig to the obturator internus muscle.
44, 44. Circumflex iliac artery.
45. Ileo-lumbar artery.
46. Anastomosis of this artery with the circumflex iliac artery.

PL. XXX.

Fig. 1.

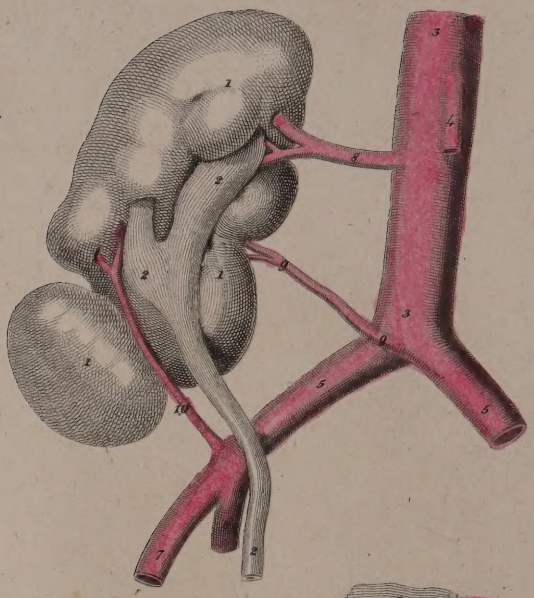

Fig. 2.

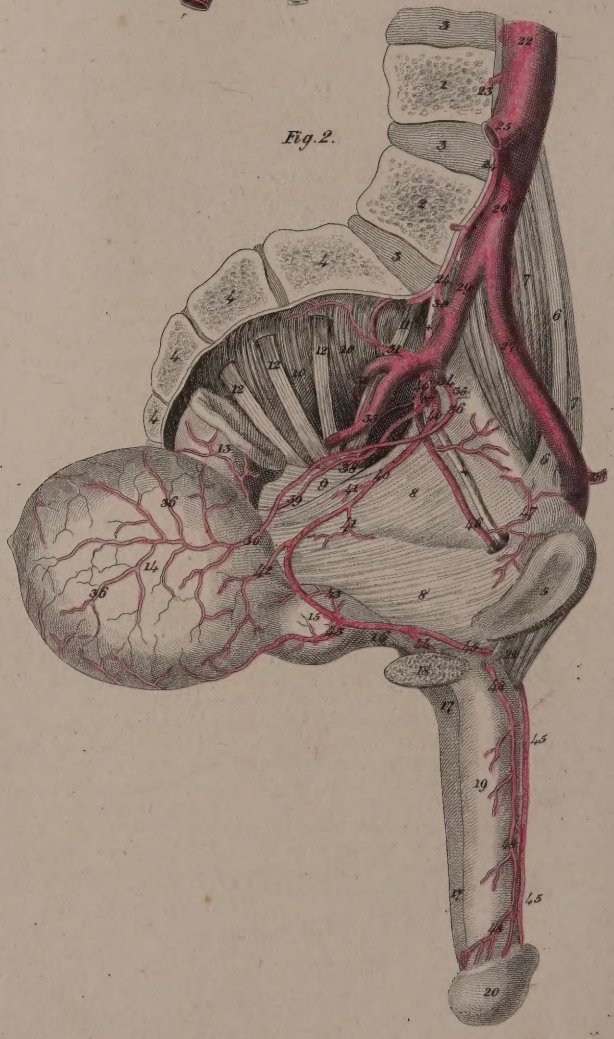

Fig. 3.

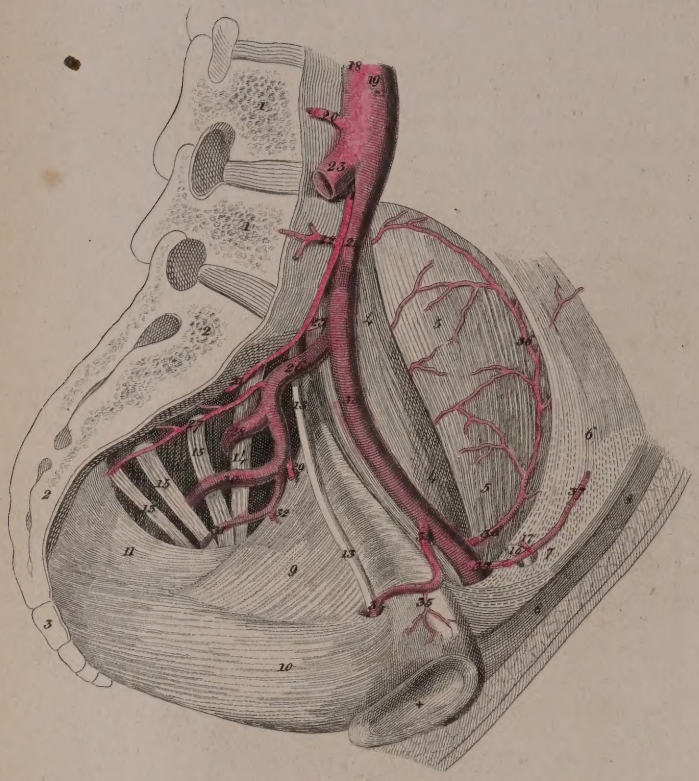

Fig. 4.

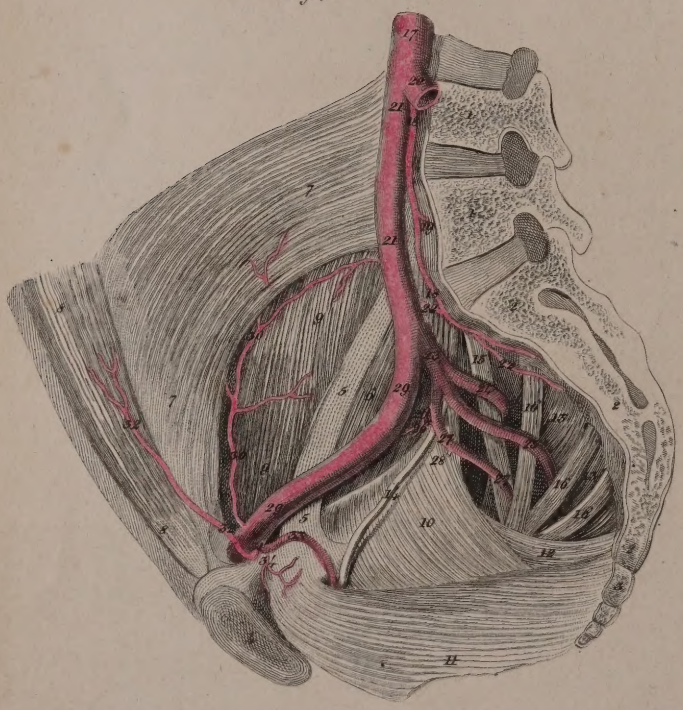

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PLATE XXX.

Figure I.

This exhibits a rare variety of the renal arteries of the right side in the body of a man of sixty.[a]

1, 1, 1. The right kidney, consisting of several lobes.
2, 2, 2. The ureter.
3, 3. Aorta.
4. Inferior mesenteric artery.
5, 5. Common iliac arteries.
6. Right hypogastric artery.
7. Right external iliac artery.
8. First renal artery.
9. Second renal artery arising at the point where the aorta divides.
10. Third renal artery arising from the common iliac.

Figure II.

Here is seen an unusual course of the left dorsal artery of the penis, from the body of a man thirty-six years old.[b]

1. Fourth lumbar vertebra.
2. Fifth lumbar vertebra.
3, 3, 3. Intervertebral fibro-cartilages.
4, 4, 4, 4. Sacrum.
5. Os pubis.
6, 6. Tendon of the psoas parvus.
7, 7. Psoas magnus.
8, 8. The levator ani stretched over the obturator internus muscle, and by a membraneous beginning arising from its tendinous envelope.
9. Smaller sacro-sciatic ligament.
10, 10. Origin of the pyriformis muscle.
† † Obturator nerve.
11. Fifth lumbar nerve.
12, 12, 12. Sacral nerves.
13. Rectum.
14. Urinary bladder.
15. Prostate gland.
16. Membraneous part of the urethra.
17, 17. Urethra.
18. Right crus of the penis, cut.
19. Penis.
20. Glans penis.
21. Suspensory ligament of the penis.
22. Aorta.
23. Fourth lumbar artery.
24. 24. Middle sacral artery.
25. Right Common iliac artery.
26. Left common iliac artery.
27, 27. External iliac and femoral artery.
28. Epigastric artery.
29. Hypogastric artery.
30. Ileo-lumbar artery.
31. Lateral sacral artery.
32. Gluteal artery.
33. Ischiatic artery.
34. Umbilical artery.
35. Part of the umbilical artery changed into ligament.
36, 36, 36, 36. Vesical artery.
37. Trunk of the common pudic artery and middle hæmorrhoidal.
38. External hæmorrhoidal artery.
39. Middle hæmorrhoidal artery.
40, 40, Artery of the penis, which runs to that organ in an unusual way below the symphysis of the pubes.
41, 41. Twigs to the levator ani.

---

[a] The renal arteries vary much in their origin, number, and division, and scarcely in any other part do varieties of the arteries present themselves so often as in the kidneys, Vide Eustachius, (Tab. anat.; Tab. 3; Fig. 1, 2, 3; Tab. 12; Fig. 9, 10,) Boehmer, (Exercitat. acad. Praef. p. 11,) and Haller, (El. Physiol. T. 7, p. 260; Icon. anatom. Fasc. 3, p. 52.)

[b] I have observed a similar occurrence on both sides in a man of twenty-eight and in a boy. I have, moreover, seen in the body of a virgin of eighteen, the artery of the clitoris running in a similar way. Burns, (l. c. p. 350,) mentions that he has seen this variety four times, and always in males. The older anatomists, Vesalius, Valverdus, Jac Sylvius, Bauhin, Vesling, Highmore, Winslow, and others have described this disposition of the dorsal artery of the penis and clitoris as regular.

42. Branch to the urinary bladder.
43. 43. Twigs to the prostate gland.
44. Deep artery of the penis.
46, 46. Obturator artery.
47. Twig to the os pubis.
48, 48, 48. Right dorsal artery of the penis.

Figure III.

Shows an unusual origin of the obturator artery from the external iliac in a man thirty years old.[a]

1, 1. Lumbar vertebræ.
2, 2. Sacrum.
3. Ossa coccygis.
† Os pubis.
4, 4. Psoas magnus.
5, 5. Iliacus internus.
6. Transversalis abdominis.
7. Internal aperture of the inguinal canal.
8. 8. Rectus abdominis muscle.
9 Obturator internus muscle.
10. Levator ani.
11. Smaller sacro-sciatic ligament.
12, 12. Origin of the pyriformis muscle.
13, 13. Obturator nerve.
14. Fifth lumbar nerve.
15, 15, 15. Sacral nerves.
16. Vas deferens.
17. Spermatic artery.
18. Aorta.
19. Inferior mesentric artery, cut.
20. Fourth lumbar artery.
21, 21. Middle sacral artery.
22. Fifth lumbar artery.
23. Right iliac artery.
24. Left iliac artery.
25. Ileo-lumbar artery arising from the trunk of the common iliac artery.
26. Hypogastric artery.
27. Lateral sacral artery.
28. Gluteal artery.
29. Umbilical artery.
30. Ischiatic artery.
31, 31. Internal pudic artery.
32. Middle hæmorrhoidal artery.
33, 33. External iliac artery.
34, 34. Obturator artery.
35. Branch to the os pubis.
36, 36. Circumflex iliac artery.
37, 37. Epigastric artery.

Figure IV.

Exhibits the origin of the obturator artery from the epigastric, as was seen in the body of a female.[a]

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[a] The origin of the obturator artery varies very much. It generally comes from the anterior or posterior trunk of the hypogastric artery; or from some one of its branches, as the gluteal, ilio-lumbar, ischiatic or common pudic. It sometimes arises from the external iliac artery. I have seen this latter variety on the left side of a man of thirty; on the right side this artery arose from the epigastric. I have, moreover, observed it on both sides in a woman of forty, and in a boy on the right side. The unusual origin of the obturator artery from the external iliac has been seen by Lieutaud, (l. c. p. 496,) Soemmering, (l. c. p. 272,) Burns, (l. c. p. 353,) Monro, (Morbid Anatomy of the Human Gullet, Stomach and Intestines, Edinburgh, 1811, p. 430,) and others. J. Cloquet, (Recherches Anatomiques sur les Hernies de l'Abdomen, Paris, 1817, p. 4,) observed it in six bodies, two males and four females, out of 250 bodies. J. K. Hesselbach, (Ueber den Ursprung und Verlauf der unteren Bauchdecken-Schlagader und der Huftbeinlochs-Schlagader. Bamberg und Wurzburg, 1819, 4, 1, Abdild,) saw it in three bodies, in thirty-two.

The obturator artery seldom arises from the external iliac or femoral artery below Poupart's ligament. Monro has noticed this irregularity, (l. c. p. 430.) I have seen the obturator artery sent off from the external iliac artery, about an inch and a half above, and in others, about an inch below the epigastric artery; and in other cases, even on the outer side of the pelvis, from the superficial femoral artery; in which case the artery ascends along the pectineus muscle and enters the pelvis at the crural aperture. The artery in this case is placed behind the crural hernia. Burns (l. c. 359.) and Otto (Seltene Wahrnehmungen, p. 102) have also seen it. It has only happened to me once, and that in the body of a woman.

[a] The obturator artery very often arises from the epigastric, or rather forms a common trunk with it. The length of this trunk varies from two lines to an inch and a half.

Haller (Icon. Anat. Fasc. 4. Nota 9.) justly observed with regard to the origin of the obturator artery. "Perpetuum equidem est, ut truncus arteriosus cum vena et nervo per sulcum in parte exteriori superiori foraminis pubis ipsi ossi inscriptum exeat in summum femur. Non tamen perpetuum est, eam arteriam a pelvis truncis nasci, cum novies viderim ex epigastrica ortam, secundum os pubis descendisse, atque per solitum canalem ad femur ivisse."

This frequent variety has been noticed by Soemmering (l. c. p. 272), Bichat (Traité d'Anatomie Descriptive, t. 4. p. 301), Burns (l. c. p. 353, Observations on the structure of the parts concerned in crural hernia, in Edinburgh Medical and Surgical Journal, vol. ii. p. 272), Cooper (The Anatomy and Surgical treatment of crural and umbilical Hernia, London 1803, and Edinburgh Medical and Surgical Journal, vol. iv. p. 231), Monro (Morbid Anatomy of the Human Gullet, Stomach and Intestines, Edin. 1811, p. 425, pl. 15. fig 1.), Beckers (Diss. Medico-chirurgica de Hernia Inguinali, Paris, 1813), and others.

J. Cloquet (l. c.) found the obturator artery arising from the epigastric on both sides in 56 bodies out of 250; of those 21 were males and 35 females. The obturator artery arose from the hypogastric on one side, and from the epigastric on the other, in 28 bodies, 15 males and 13 females.

J. K. Hesselboch (l. c. pag. 26. Tab. 1.) observed the obturator artery arising from the epigastric, among 32 bodies, nine times on the right side, and ten times on the left side.

I have frequently seen this irregularity; in three bodies, the obturator artery arises once on one or other side, or on both sides, from the epigastric artery.

This variety occurs more frequently in females than in males. In men affected with crural hernia, if the obturator artery arises from the epigastric, it generally runs on the ante-

1. 1. Lumbar vertebræ.
2, 2, 2, 2. Sacrum.
3. Ossa coccygis.
4. Os pubis.
5, 5. Tendon of the psoas parvus.
6. Psoas magnus.
7, 7. Transversalis abdominis muscle.
8, 8. Rectus abdominis muscle.
9, 9. Iliacus internus muscle.
10. Obturator internus.
11. Levator ani muscle.
12. Smaller sacro-sciatic ligament.
13. 13. Origin of the pyriform muscle.
14, 14. Obturator nerve.
15. Fifth lumbar nerve.
16, 16, 16. Sacral nerves.
17. Aorta.
18, 18. Middle Sacral artery.
19. Fifth lumbar artery.
20. Left iliac artery.
21, 21. Right iliac artery.
22, 22. Lateral sacral artery.[a]
23. Hypogastric artery.
24. Gluteal artery.
25. Ischiatic artery.
26, 26. Vesical artery.
27, 27. Internal pudic artery.
28. Middle hæmorrhoidal artery.
29, 29. External iliac artery.
30. 30. Circumflex iliac artery.
31. Common trunk of the epigastric and obturator arteries.
32, 32. Epigastric artery.
33. Obturator artery.
34. Twig to the os pubis.

[a] This artery sometimes comes from the common iliac.

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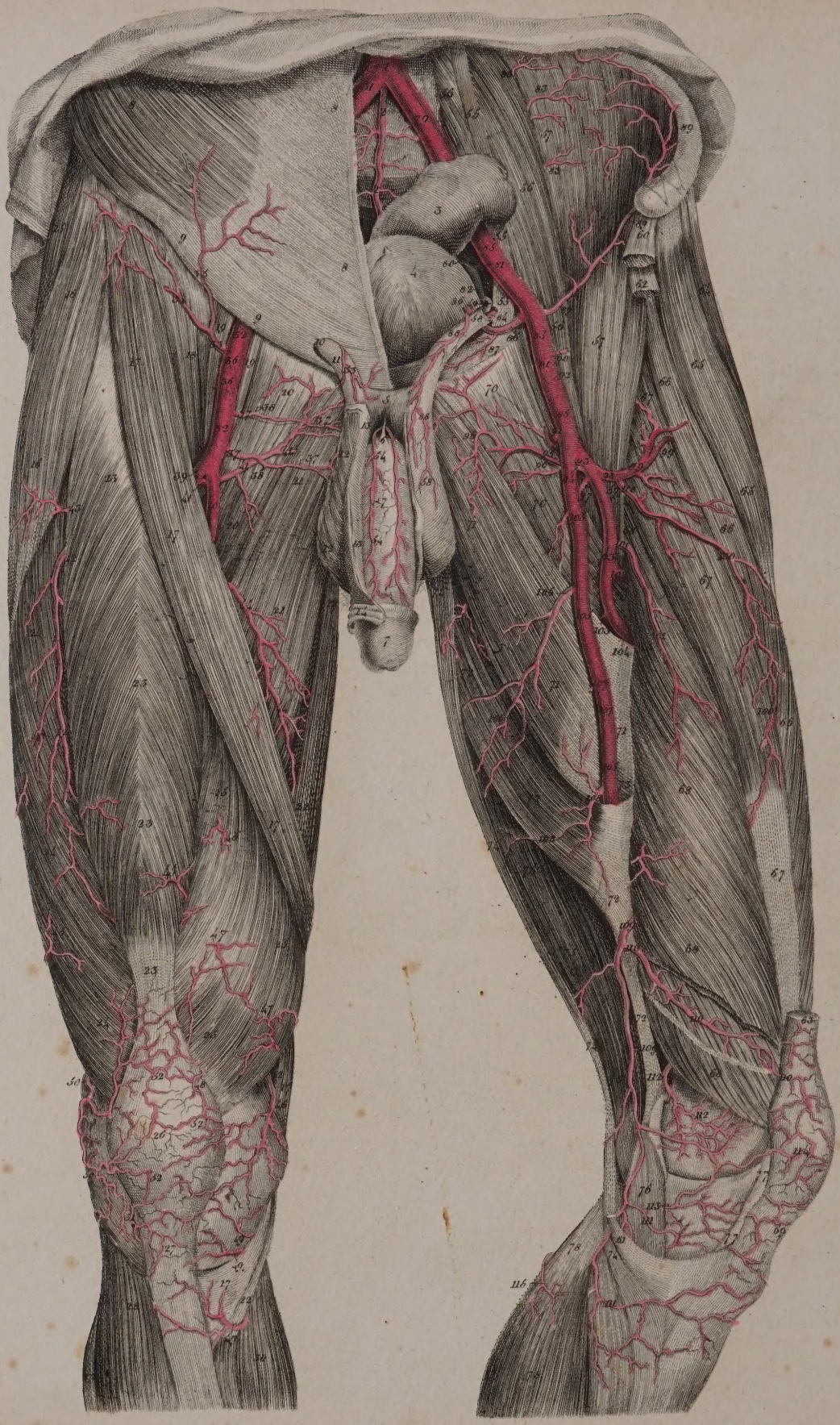
rior and inner surface of the hernia, and descends into the pelvis.

Very rarely some branch of the hypogastric artery joined with a large branch of the epigastric forms the obturator. Portal (Anatomie Medicale T. 3. p. 322,) has described such a disposition ;—Tr s souvent l'artere epigastrique fournit l'artere obturatrice ; mais alors quelquefois il y a deux arteres obturatrices, dont l'une vient de l'hypogastrique, comme cela a lieu ordinairement et l'autre est formée par l'epigastrique. J'ai vu ces deux arteres s'anastomoser tronc à tronc avant de sortir du bassin, et je les ai vues ne s'anastomoser que par quelques-uns de leurs rameaux, apres avoir passé par l'echancrure ovalaire.

J. K. Hesselbach (l. c.) has seen three examples of this variety, and illustrated them by a plate (Tab. 3.)

Lastly, examples are not wanting, in which the epigastric artery has arisen from the obturator. This unusual origin, which I have not seen, has been observed by Monro (Morbid Anatomy of the Human Gullet, &c. p. 427.) I have a specimen in which the epigastric artery takes its rise from the obturator, and passes upwards and inwards to the rectus muscle. J. K. Hesselbach (l. c. Tab. 2.) has delineated it.

PL. XXXI.



P. Mitchell fecit.

PLATE XXXI.

This exhibits the arteries of the anterior part of the thigh.

1. Division of the aorta into the common iliac arteries.
2, 2. Middle sacral artery.
3. Rectum.
4. Urinary bladder.
5. Symphysis of the pubes.
6. Suspensory ligament of the penis.
7. Penis.

RIGHT SIDE.

8, 8, 8. External oblique muscle of the abdomen.
9, 9. Poupart's ligament.
10. Abdominal ring.
11. Spermatic cord.
12, 12. Scrotum.
13. Skin of the penis cut and reflected.
14. The prepuce.
15. Gluteus medius.
16. Tensor vaginæ femoris.
17, 17, 17, 17, 17. sartorius.
18. Iliacus internus.
19, 19. Psoas magnus.
20, 20. Pectineus.
21, 21. Adductor longus.
22, 22, 22. Gracilis.
23, 23, 23, 23. Rectus femoris.
24, 24, 24. Vastus externus.
25, 25, 25. Vastus internus.
26. Patella.
27. Ligamentum patellæ.
28. Tibialis anticus.
† Extensor communis digitorum.
29. Peroneus longus.
30. Internal head of the gastrocnemius.
31. Common iliac artery.
32. 32. Femoral artery.
33. Superficial epigastric artery.
34. Branch to the iliacus, sartorius, and tensor vaginæ femoris.
35. Ascending cutaneous branch.
36, 36. Twigs to the inguinal glands, cut.
37, 37. External pudic arteries.
38, 38. Twigs to the inguinal glands and skin, cut.
39. Deep femoral artery.
40. Superficial femoral artery.
41, 41, 41. Internal circumflex artery of the thigh.
42, 42. Descending branch of the external circumflex artery of the thigh.
43, Branch of the external circumflex artery of the thigh to the tensor vaginæ femoris.
44. Branch to the sartorius, gracilis, and adductors.
45, 45, 45, 45, 45. Small twigs to the skin and muscles.
46. Superior internal articular artery of the knee, which runs over the surface of the knee.[a]
47, 47. Twigs of this artery which perforate the vastus.
48. Twig to the patella.
49, 49, 49. Inferior twigs of the same artery.
50, 50. External superior articular artery of the knee.
51. Twig of the recurrent branch of the anterior tibial artery.
52, 52, 52. Arterial network of the patella.
53. Twig of the epigastric artery to the tunica vaginalis.
54, 54. Arteria dorsalis penis.

LEFT SIDE.

55, 55, 55. Tendon of the psoas parvus.
56, 56, 56. Psoas magnus.
57, 57, 57. Iliacus internus.
58, 58. Spermatic cord.
59. Vas deferens.
60. Origin of the sartorius, cut.
61. Termination of the same muscle.
62. Origin of the rectus femoris, cut.
63. Termination of this muscle.
64. Gluteus medius.
65, 65. Tensor vaginæ femoris.
66, 66, 66. Vastus externus.
67, 67, 67. Cruralis.
68, 68, 68, 68. Vastus internus.
69. Ligamentum patellæ.
70, 70, 70. Pectineus.
71, 71, 71. Adductor longus.
72, 72, 72. Adductor magnus.

[a] This artery, which sends twigs to the surface of the knee, is generally present. It is to be distinguished from the deep and internal superior articular artery of the knee.

73. Aperture through which the femoral artery descends.
74, 74, 74, 74. Gracilis.
75, 75, 75. Semimembranosus muscle.
76. Internal lateral ligament of the knee.
77, 77. Capsule of the knee-joint cut and reflected.
78, 78. Internal head of the gastrocnemius.
79. Common iliac artery.
80. Internal iliac or hypogastric artery.
81. Gluteal artery.
82. Obturator artery.
83, 83, 83. Branches of the ileo-lumbar artery.
84. Spermatic artery.
85, 85, 85. External iliac and common femoral artery.
86, 86. Epigastric artery.
87. Twig to the os pubis.
88, 88. External spermatic artery, or artery of the tunica vaginalis.
89, 89, 89. Circumflex iliac artery.
90. Superficial epigastric artery, cut.
91, 91. External pudic arteries, cut.
92. Twig to the inguinal glands and skin, cut.
93, 93. Deep femoral artery.
94. Internal circumflex artery of the thigh.
95 Deep circumflex branch.
96, 96. Superficial circumflex branch.
97. Twig to the pectineus and adductor muscles.
98. External circumflex artery of the thigh.
99, 99. Ascending branch.
100, 100, 100. Descending branch.
101, 101. Twig to the cruralis and vastus internus.
102. First perforating artery.
103. Second perforating artery.
104. Third perforating artery.
105, 105, 105. Superficial femoral artery.
106. Branch to the adductor longus, adductor magnus, and to the gracilis.
107, 107. Twigs to the sartorius, cut.
108, 108. Twig to the adductor magnus, semimembranosus, and gracilis.
109, 109. Superficial internal superior articular artery of the knee.
110, 110, 110. Twig perforating the vastus internus and proceeding to the patella.
111, 111. Twig proceeding to the inner surface of the leg.
112, 112. Deep internal superior articular artery of the knee.
113, 113. Branch of the internal and inferior articular artery of the knee.
114. Arterial net-work of the patella.
115. Twig to the gastrocnemius.

PL. XXXII.

E.M.Mitchell sculp.t

PLATE XXXII.

This represents the arteries of the posterior part of the pelvis and thighs.

1. Ossa coccygis.
2. External sphincter of the anus.
3. Anus.
4. Scrotum.
5. Glans penis.

RIGHT SIDE.

6, 6. Gluteus medius.
7, 7, 7, 7, 7, 7, 7. Gluteus maximus.
8, 8, 8. Vastus externus.
9, 9, 9, 9, 9, 9. Biceps flexor cruris.
10, 10, 10, 10. Semitendinosus muscle.
11, 11, 11, 11, 11. Semimembranosus muscle.
12, 12. Adductor magnus.
13, 13, 13, 13. Gracilis.
14, 14, 14. Sartorius.
15. Vastus internus.
16, 16. Plantaris muscle.
17, 17. Internal head of the gastrocnemius.
18, 18. External head of the gastrocnemius.
19, 19. Soleus.
20. Twig of the ileo-lumbar artery.
21, 21, 21, 21, 21, 21. Twigs of the gluteal artery.
22, 22, 22, 22. Twigs of the ischiatic artery.
23. Twig of the internal pudic artery.
24, 24, 24. Twigs of the perforating arteries.
25, 25, 25. Popliteal artery.
26. Twig to the semitendinosus and semimembranosus muscles.
27. Internal and superficial superior articular artery of the knee.
28. Twig to the semimembranosus muscle.
29. External superior articular artery of the knee.
30. Deep internal superior articular artery of the knee.
31. Trunk of the sural arteries.
32, 32, 32, 32, 32. Superficial or cutaneous sural arteries.
33, 33, 33. Deep or muscular sural arteries.

LEFT SIDE.

34, 34, 34. Origin of the Gluteus muscle, cut.
35, 35. Insertion of this muscle.
36, 36, 36. Origin of the gluteus medius muscle, cut.
37, 37, 37. Insertion of this muscle.
38, 38, 38, 38. Gluteus minimus,
39, 39. Great sacro-sciatic ligament.
40, 40. Pyramidalis muscle.
41, 41, 41, 41. Obturator internus muscle.
42, 42, 42. Gemelli muscles.
43, 43. Levator ani.
44, 44. Quadratus femoris muscle.
45, 45, 45. Ischiatic nerve.
46, 46, 46, 46. Gracilis muscle.
47, 47, 47, 47, 47, 47, 47, 47, 47. Adductor magnus muscle.
48, 48, 48, 48. Long head of the biceps flexor cruris muscle.
49. Short head of the same muscle.
50, 50. Insertion of this muscle.
51, 51, 51, 51. Semitendinosus muscle.
52, 52, 52, 52, 52. Semimembranosus muscle.
53, 53, 53, 53, 53, 53. Vastus externus.
54. Patella.
55. Ligamentum patellæ.
56. External lateral ligament of the knee.
57, 57. Plantaris muscle.
58, 58, 58, 58, 58. Gastrocnemius muscle.
59, 59. Soleus muscle.
60, 60. Peroneus longus muscle.
61, 61. Extensor longus communis digitorum.
62, 62. Gluteal artery.
63, 63, 63, 63, 63, 63, 63, 63. Superficial branches.
64, 64, 64, 64, 64. Deep branches.
65. Twig to the great sacro-sciatic ligament.
66, 66. Ischiatic artery.
67. Twig to the sacro-sciatic ligament.
68, 68, 68, 68, 68, 68. Branches to the gluteus maximus, cut.

69, 69. Twigs to the ischiatic nerve.
70, 70. Branches to the obturator internus, gemelli and quadratus femoris muscles.
71, 71. Branch descending to the flexor muscles of the leg.
72, 72. Branch to the adductor muscles.
73, 73. Internal pudic artery.
74. Twigs to the obturator internus and gemelli muscles.
75. External hæmorrhoidal artery.
76, 76. Twigs to the tuberosity of the ischium.
77, 77. First perforating artery.
78. Twigs communicating with the external circumflex artery of the thigh.
79. Twig of the external circumflex artery of the thigh.
80. Twig to the ischiatic nerve.
81, 81, 81, 81. Muscular twigs.
82, 82. Second perforating artery.
83, 83. Third perforating artery.
84, 84, 84, 84. Popliteal artery.
85, 85, 85, 85, 85, 85, 85. Twigs to the muscles.
86, 86. Superficial internal superior articular artery of the knee.
87, 87, 87, 87. External superior articular artery of the knee.
88. Deep internal superior articular artery of the knee.
89. Middle or azygous articular artery of the knee.
90, 90, 90, 90, 90, 90. Superficial sural arteries.
* Middle superficial sural artery.
91, 91, 91 Deep sural arteries.
92, 92. External inferior articular artery of the knee.
93, 93. Recurrent branch of the anterior tibial artery.

PLATE XXXIII.

Figure I.

Represents the unusual origin of the dorsal artery of the penis from the deep femoral artery, observed in the body of a man, twenty-seven years old.[a]

1. Gluteus medius.
2, 2. Tensor vaginæ femoris.
3, 3, 3. Sartorius muscle.
4, 4. Rectus femoris muscle.
5. Vastus externus.
6, 6. Iliacus internus.
7, 7. Psoas magnus.
8, 8. Pectineus.
9, 9. Adductor longus.
10. Gracilis.
11, 11, Poupart's ligament.
12. Abdominal ring.
13. Spermatic cord.
14. Penis.
15. Suspensory ligament of the penis.
16. Common femoral artery.
17. Superficial epigastric artery.
18, 18. Twigs to the inguinal glands.
19. First external pudic artery.
20. Superficial femoral artery.
21. Deep femoral artery.
22, 22, 22, 22. Dorsal artery of the penis.
23. Branch to the scrotum.
24, 24. Left dorsal artery of the penis.

Figure II.

In the body of a man thirty-four years old, the epigastric and obturator arteries formed a common trunk; and the circumflex iliac artery, arising from the common femoral artery below Poupart's ligament, sent off a large branch to the external side of the thigh.[b]

1. Rectum.
2. Urinary bladder.
3. Spermatic cord.
4. Vas deferens.
5. Spermatic artery.
6, 6. Tendon of the psoas parvus.
7, 7, 7. Psoas magnus.
8, 8, 8. Iliacus internus.
9, 9. Pectineus.
10, 10. Adductor longus.
11. Gracilis.
12, 12. Sartorius.
13, 13. Rectus femoris.
14, 14, 14. Tensor vaginæ femoris.
15. Vastus externus.
16. Gluteus medius.
17, 17. Middle sacral artery.
18. Common iliac artery.
19. Hypogastric artery.
20, 20. External iliac artery and its continuation as the common femoral, which soon after its exit from the abdomen, divides into two trunks.
21. Common trunk of the epigastric and obturator arteries.
22. Epigastric artery.
23. Obturator artery.
24. Twig to the os pubis.
25. Artery of the tunica vaginalis.
26. Circumflex iliac artery.
27, 27. Proper circumflex branch.
28. Unusual external branch.
29. Twig to the inguinal glands, cut.
30. Superficial epigastric artery, cut.
31. Muscular branch.
32, 32. Superficial femoral artery.
33. Internal circumflex artery of the thigh.
34. Muscular branch.
35, 35. Deep femoral artery.
36. External circumflex artery of the thigh.
37, 37. External pudic artery.
38. First perforating artery.

Figure III.

Shows the rare origin of the epigastric artery from the deep femoral in the body of a man of twenty-four.[a]

[a] I have also seen an unusual origin of the dorsal artery of the penis, from the common femoral on the right side of a man of thirty-six years old; also from the first external pudic artery in the body of a man forty years old, and in the body of a boy.

[b] The circumflex iliac artery frequently arises from the common femoral artery below Poupart's ligament, and then generally gives off a branch to the muscles of the thigh. Burns (l. c. p. 362.) mentions such a case.

[a] According to Earclay, (l. c. p. 232,) Monro, jun. observed a similar case. Other examples are not wanting, in which the epigastric artery arose from the femoral below Poupart's ligament. Burns, (l. c. p. 360,) remarked this variety, and J. K. Hesselbach, (l. c.) saw it thrice. It has occurred to me twice.

1. Gluteus medius.
2, 2, 2. Tensor vaginæ femoris.
3. Vastus externus.
4, 4. Rectus femoris.
5, 5, 5. Sartorius.
6, 6. Iliacus internus.
7, 7. Psoas magnus.
8, 8. Pectineus.
9, 9. Adductor longus.
10. Gracilis.
11, 11. Poupart's ligament.
12. Femoral artery, which immediately after its exit from the pelvis, divides into superficial and deep arteries.[a]
13. Circumflex iliac artery.
14, 14. Superficial femoral artery.
15, 15. Superficial epigastric artery.
16. Twig to the inguinal glands.
17, 17. Internal circumflex artery of the thigh.
18, 18. First external pudic artery.
19, 19. Deep femoral artery.
20, 20. Epigastric artery.
21, 21. Second external pudic artery.
22, 22. External circumflex artery of the thigh.

a The common femoral artery generally divides into the superficial and deep femoral, two inches below the crural arch, on the extremity of the iliacus muscle, between the trochanter minor and pubes. This division sometimes occurs higher up, and according to my observation, more frequently in the female than in the male. Moreover, I have frequently seen this division in bodies of small stature. Nay, there are examples of the common femoral artery dividing into two trunks within the pelvis. Burns (l. c. p. 362), found this disposition in three bodies. I have seen the division of the common femoral artery above Poupart's ligament, on both sides in the body of a woman.

Figure IV.

Shows the rare origin of the epigastric and obturator arteries, from the common femoral below Poupart's ligament in the body of a woman.

1. Gluteus medius.
2, 2. Tensor vaginæ femoris.
3. Vastus externus.
4, 4. Rectus femoris.
5, 5, 5. Sartorius.
6, 6. Iliacus internus.
7, 7. Psoas magnus.
8. Pectineus.
9, 9. Adductor longus.
10, 10, 10. Gracilis
11, 11. Ligament of Poupart.
12, 12. Common femoral artery.
13. Circumflex iliac artery.
14. Trunk of the epigastric and obturator arteries.
15. Epigastric artery.
16. Obturator artery.
17, 17. Twig to the psoas magnus and pectineus muscles.
18. Superficial epigastric artery.
19, 19, 19. Twigs to the skin of the abdomen.
20. Twig to the iliacus and sartorius muscles.
21. First external pudic artery.
22. Twig to the inguinal glands.
23, 23. Superficial femoral artery.
24. Internal circumflex artery of the thigh.
25, 25. Second and third external pudic arteries.
26. Deep femoral artery.
27. External circumflex artery of the thigh.

Fig.1.

Fig.3.

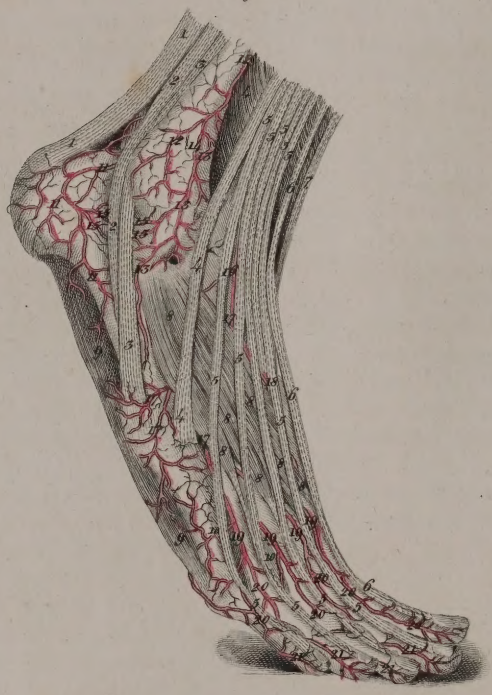


Fig.2.

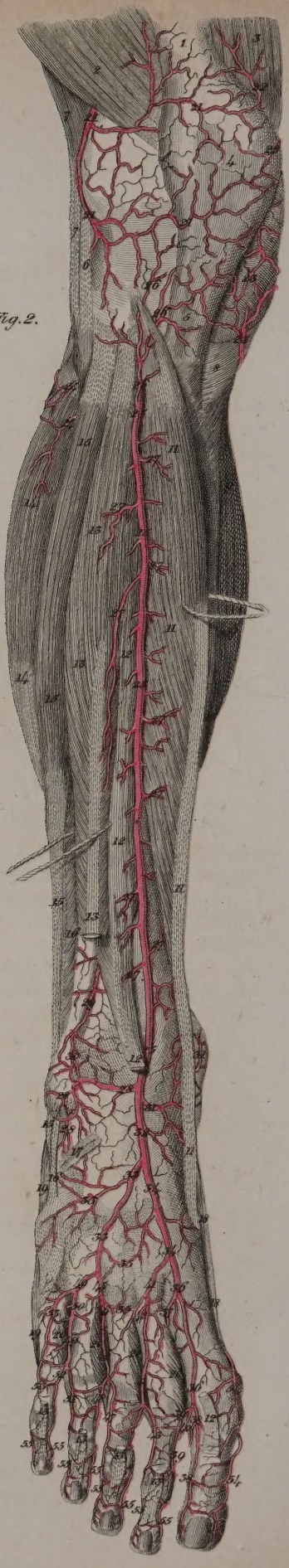


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PLATE XXXIV.

This shows the Arteries on the anterior part of the Leg and Foot of a Man.

Figure I.

Represents the superficial branches.

1. Patella.
2. Vastus externus.
3. Vastus internus.
4. Tendon of the rectus femoris muscle.
5. Ligamentum patellæ.
6. External lateral ligament of the knee.
7, 7. Biceps flexor cruris.
8. Tendon of the sartorius.
9, 9, 9. Anterior surface of the tibia.
10. Malleolus internus.
11. Malleolus externus.
12, 12. Internal head of the gastrocnemius.
13. Soleus.
14, 14. External head of the gastrocnemius.
15, 15, 15, 15, 15. Tibialis anticus muscle.
16, 16, 16, 16, 16, 16, 16, 16, 16, 16, 16, 16. Extensor longus communis digitorum.
17, 17, 17, 17. Extensor proprius hallucis.
18, 18, 18, 18. Peroneus longus.
19, 19, 19. Peroneus brevis.
20, 20, 20. Peroneus tertius.
21, 21, 21, 21, 21, 21, 21, 21, 21. Extensor brevis communis digitorum.
† Abductor hallucis.
** Abductor minimi digiti.
22, 22, 22, 22. External interossei muscles.
23, 23, 23, 23, 23. Superior external articular artery of the knee.
24, 24, 24. Branches of the superior internal articular artery of the knee.
25, 25. Branches of the inferior internal articular artery of the knee.
26. Branch of the inferior external articular artery of the knee.
27, 27. Branches of the anterior tibial recurrent artery.
28, 28. Arterial network of the patella.
29, 29, 29, 29, 29, 29. Superficial twigs of the anterior tibial artery.
30. Anterior peroneal artery.
31. Anterior tibial artery.
32, 32. External anterior malleolar artery.
33. Anastomosis of this artery with the anterior peroneal.
34. Twig of the internal posterior malleolar artery.
35, 35. Internal anterior malleolar artery.
36. Dorsal artery of the foot.
37. External tarsal artery.
38. Internal tarsal artery.
39. First Metatarsal or dorsal interosseous artery.
† Anastomosing branch with the external plantar artery.
40, 40. External dorsal branch of the great toe.
41, 41. Internal dorsal branch of the second toe.
42. Anastomosing branch with the plantar artery of the great toe.
43, 43. Second metatarsal or dorsal interosseous artery.
44, 44. External dorsal artery of the second toe.
45, 45. Internal dorsal artery of the third toe.
46. Third metatarsal or dorsal interosseous artery.
47, 47. External dorsal artery of the third toe.
48. Internal dorsal artery of the fourth toe.
49. Fourth metatarsal or dorsal interosseous artery.
50. External dorsal artery of the fourth toe.
51. Internal dorsal artery of the fifth toe.
52, 52. External dorsal artery of the fifth toe.
53, 53. Internal dorsal branches of the great toe from the plantar artery.
54, 54, 54, 54, 54, 54, 54, 54. Anterior dorsal branches of the toes from the plantar digital arteries.

Figure II.

Exhibits the course of the anterior tibial artery.

1. Tendon of the rectus femoris muscle.
2. Vastus externus.
3. Vastus internus.
4. Patella.
5. Ligamentum patellæ.
6. External lateral ligament of the knee.
7, 7. Biceps flexor cruris.
8. Tendon of the sartorius.
9, 9. Internal head of the gastrocnemius.
10. Soleus.
11, 11, 11, 11. Tibialis anticus.
12, 12, 12, 12. Extensor proprius hallucis.

13, 13, 13, 13, 13, 13, 13. Extensor longus communis digitorum.
14, 14. External head of the gastrocnemius.
15, 15, 15, 15. Peroneus longus.
16, 16. Peroneus brevis.
17. Origin of the extensor brevis communis digitorum.
18, 18. Abductor hallucis.
19, 19. Abductor minimi digiti.
20, 20, 20, 20. External interossei muscles.
21, 21, 21, 21, 21. External superior articular artery of the knee.
22, 22. Branches of the internal superior articular artery of the knee.
23, 23. Branches of the internal inferior articular artery of the knee.
24, 24. Branches of the external inferior articular artery of the knee.
25, 25, 25, 25, 25. Anterior tibial artery.
26, 26, 26. Recurrent artery.
27, 27, 27, 27, 27, 27, 27, 27, 27. Muscular branches.
28, 28, 28. External anterior malleolar artery.
29. Anterior peroneal artery.
30. Anastomosis of the anterior peroneal artery, with the external malleolar.
31, 31. Internal anterior malleolar artery.
32. Dorsal artery of the foot.
33, 33, 33. External tarsal artery.
34, 34. Internal tarsal artery.
35, 35. Dorsal arch.
36, 36. First metatarsal or dorsal interosseous artery.
37. Great anastomosing branch, with the external plantar artery.
38, 38. External dorsal artery of the great toe.
39, 39. Internal dorsal artery of the second toe.
40. Anastomosing branch, with the plantar artery of the great toe.
41, 41. Second metatarsal or dorsal interosseous artery.
42. Anastomosis of this artery with the deep perforating branch from the plantar interosseal artery.
43. External dorsal artery of the second toe.
44. Internal dorsal artery of the third toe.
45, 45. Third metatarsal or dorsal interosseous artery
46. Anastomotic perforating branch.
47. External dorsal artery of the third toe.
48. Internal dorsal artery of the fourth toe.
49, 49. Fourth metatarsal or dorsal interosseous artery.
50. Anastomosis of this artery with a perforating branch.
51. External dorsal artery of the fourth toe.
52. Internal dorsal artery of the fifth toe.
53, 53. External dorsal artery of the fifth toe.
54, 54. Internal dorsal artery of the great toe from the plantar artery.
55, 55, 55, 55, 55, 55, 55, 55. Anterior dorsal branches of the toes from the plantar arteries of the toes.

Figure III.

Shows the foot from the outside.

1, 1. Tendo Achillis.
2, 2. Tendon of the peroneus longus.
3, 3. Tendon of the peroneus brevis.
4, 4, 4. Peroneus tertius.
5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5. Tendons of the extensor longus communis digitorum.
6, 6, 6. Extensor proprius hallucis.
7. Tibialis anticus muscle.
8, 8, 8, 8, 8, 8, 8, 8. Extensor brevis communis digitorum.
9, 9. Abductor minimi digiti.
10, 10. External interossei muscles.
11, 11, 11. External artery of the calcaneum.
12, 12. Anterior peroneal artery.
13, 13, 13. External anterior malleolar artery.
14. Anastomosis of this artery with the anterior peroneal.
15, 15, 15, 15. Anastomosis of the external malleolar artery with the external artery of the calcaneum.
16. Dorsal artery of the foot.
17, 17, 17. External tarsal artery.
18, 18. Internal tarsal artery.
19, 19, 19. Metatarsal or dorsal interosseous arteries.
20, 20, 20, 20, 20. Dorsal arteries of the toes.
21, 21, 21, 21. Anterior dorsal branches of the toes.

PL. XXXV.

Fig. 1.

Fig. 3.

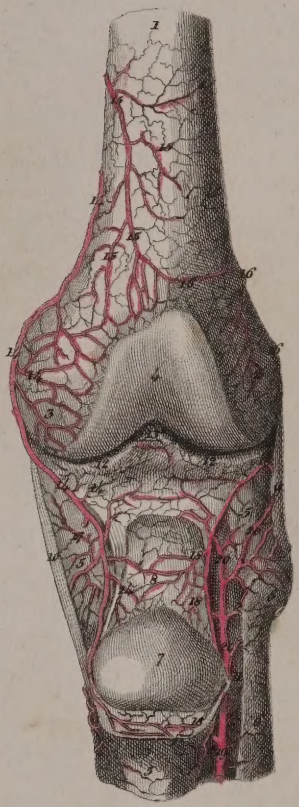


Fig. 2.

E. Mitchell sculpt

PLATE XXXV.

Exhibits the Arteries of the posterior part of the Leg.

Figure I.

Shows the superficial arteries.

1. Vastus externus.
2, 2. Tendon of the sartorius muscle.
3, 3. Tendon of the gracilis muscle.
4, 4. Semitendinosus muscle.
5, 5, 5. Semimembranosus muscle.
6, 6. Biceps flexor cruris.
7, 7, 7, 7, 7. Plantaris muscle.
8, 8, 8, 8. Gastrocnemius.
9, 9, 9. Soleus.
10, 10, 10. Tendo Achillis.
11, 11. Flexor longus communis digitorum.
12. Tendon of the tibialis posticus.
13, 13, 13, 13. Peroneus longus.
14, 14, 14, 14. Peroneus brevis.
15, 15. Flexor proprius hallucis.
16. Origin of the extensor brevis communis digitorum.
17, 17. Tendon of the peroneus tertius.
18. Plantar aponeurosis.
19. Abductor minimi digiti.
20, 20, 20. Popliteal artery.
21, 21, 21, 21, 21. Muscular branches.
22, 22. Internal superior articular artery of the knee running superficially.
23. External superior articular artery of the knee.
24. Deep internal superior articular artery of the knee.
25. Sural artery.
26, 26, 26, 26, 26, 26, 26, 26. Superficial sural branches.
27, 27. Gastrocnemial arteries.
28, 28. Posterior tibial artery.
29. Muscular branch.
30. Internal posterior malleolar artery.
31, 31. Muscular branches arising from the posterior peroneal artery.
32, 32. Posterior peroneal artery.
33, 33. Twigs to the calcaneum.
34, 34. Twigs to the calcaneum from the posterior tibial artery.
35. Twigs of the external anterior malleolar artery.
36. External dorsal artery of the little toe.

Figure II.

Shows the deep arteries.

1. Insertion of the adductor magnus muscle.
2. Portion of the biceps muscle.
3. Tendon of the semitendinosus muscle.
4. Tendon of the semimembranosus muscle.
5, 5. Origins of the gastrocnemius.
6. Origin of the plantaris.
7. External lateral ligament of the knee.
8. Posterior ligament of the knee.
9, 9. Popliteus muscle.
10, 10. Origin of the soleus.
11, 11, 11, 11. Flexor longus communis digitorum.
12, 12, 12. Tibialis posticus.
13, 13, 13. Flexor longus pollicis.
14, 14, 14, 14, 14. Peroneus longus.
15, 15, 15, 15. Peroneus brevis.
16, 16. Tendon of the peroneus tertius.
17. Tendo Achillis.
18. Posterior ligament of the ankle joint.
19. Origin of the extensor brevis communis digitorum.
20. Abductor minimi digiti.
21. Plantar aponeurosis.
22, 22, 22, 22. Popliteal artery.
23. Superficial internal superior articular artery of the knee.
24, 24, 24. Muscular branches.
25. Deep internal superior articular artery of the knee.
26. External superior articular artery of the knee.
27. Sural artery.
28. Azygous articular artery of the knee.
29. 29. External inferior articular artery of the knee.
30, 30. Internal inferior articular artery of the knee.
31. Twig to the soleus.
32. Anterior tibial artery.
33. Great nutritious artery of the tibia.
34. Branch to the soleus muscle, cut.
35, 35, 35, 35. Posterior tibial artery.
36, 36, 36, 36. Branches to the muscles.

37. Internal posterior malleolar artery.
38. 38. Twigs to the calcaneum.
39, 39. Common peroneal artery.
† † Posterior peroneal artery.
40, 40. Muscular branches from the common peroneal artery.
41, 41. Twigs to the calcaneum.
42. Vascular network of the calcaneum.
43, 43. Branches going to the outer surface of the foot.
44, 44. External dorsal artery of the little toe.

FIGURE II.

Represents the deep arteries of the knee and their anastomoses.

1. Lower part of the left thigh-bone.
2. External condyle.
3. Internal condyle.
4. Articular surface.
5, 5, 5. Tibia.
6, 6. Fibula.
7. Articular surface of the patella.
8. Ligamentum patellæ.
9. External lateral ligament of the knee.
10. Internal lateral ligament of the knee.
11. Interosseous ligament.
12, 12. Semilunar cartilages of the knee.
13. Anterior crucial ligament.
14, 14, 14, 14, 14, 14. Branch of the superficial internal superior articular artery of the knee.
15, 15, 15, 15. Deep internal superior articular artery of the knee.
16, 16, 16. Twigs of the external superior articular artery of the knee.
17, 17, 17. Internal inferior articular artery of the knee.
18, 18, 18, 18. External inferior articular artery of the knee.
19. Anterior tibial artery.
20, 20, 20, 20. Recurrent branch of the anterior tibial artery.

Fig 1

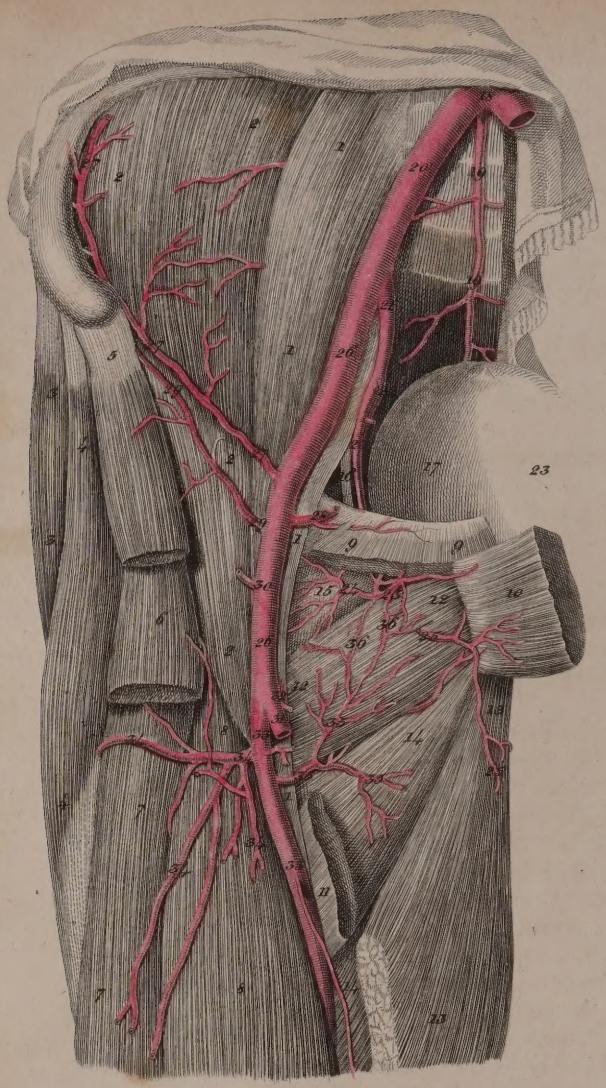


Fig 2

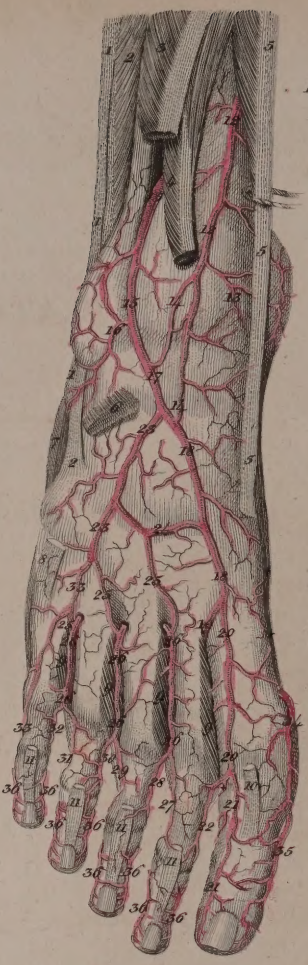


Fig 3

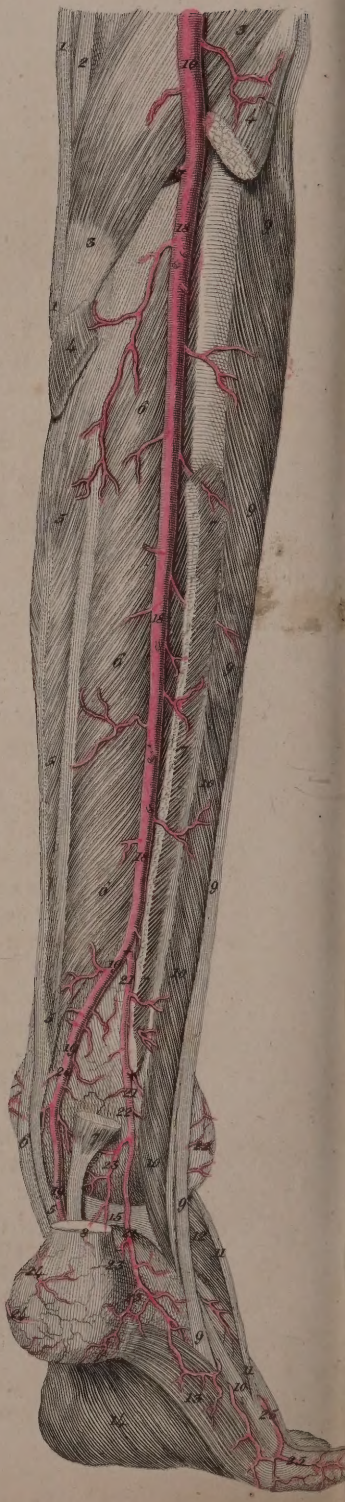


Fig 4

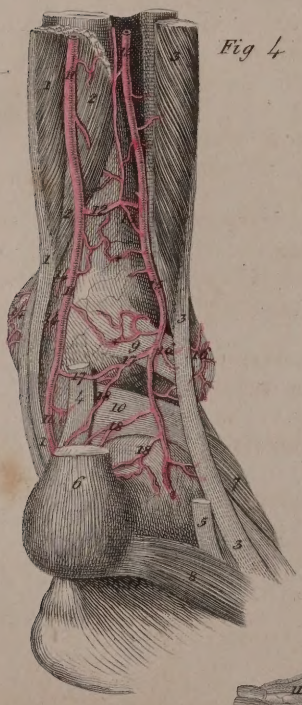
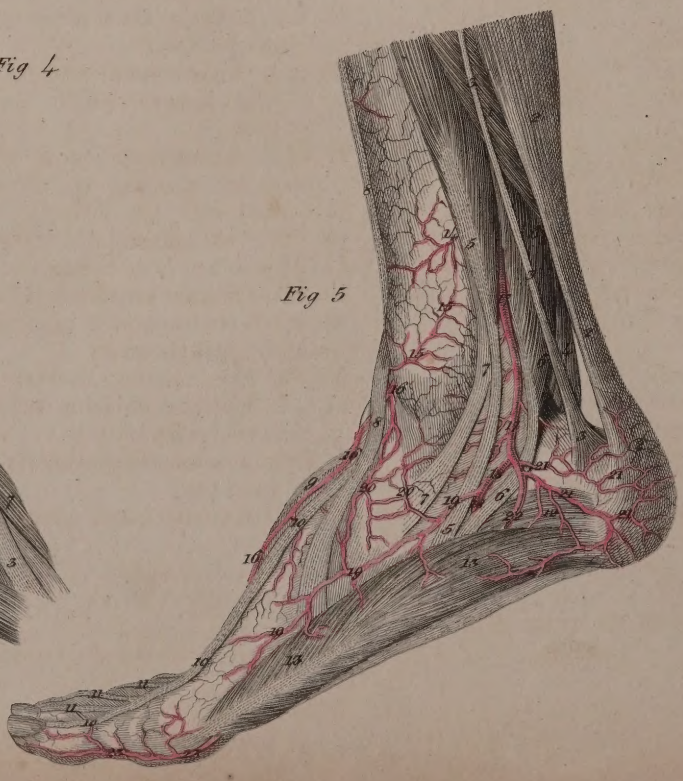


Fig 5



E. Mitchell sculpt.

PLATE XXXVI.

Figure I.

Represents the obturator artery from the body of a man.

1, 1, 1, 1. Psoas magnus.
2, 2, 2, 2. Iliacus internus.
3, 3. Gluteus medius.
4, 4. Tensor vaginæ femoris.
5. Origin of the sartorius.
6. Origin of the rectus femoris muscle.
7, 7. Vastus externus.
8, 8. Cruralis muscle.
9, 9. Origin of the pectineus.
10. Head of the adductor brevis, reflected.
11. Insertion of this muscle.
12, 12. Obturator externus muscle.
13, 13. Adductor longus.
14, 14. Adductor magnus.
15. Capsular ligament of the hip-joint.
16. Obturator nerve.
17. Urinary bladder.
18. Division of the aorta.
19, 19. Middle sacral artery.
20. Common iliac artery.
21. Hypogastric artery.
22. Gluteal artery.
23, 23. Obturator artery.
24. Twig to the capsular ligament.
25. Twigs to the adductor muscles.
26, 26. External iliac artery, and its continuation as the common femoral.
27, 27, 27. Circumflex iliac artery.
28. Epigastric artery.
29. An unusual circumflex iliac artery
30. Superficial epigastric artery.
31. Trunk of the superficial femoral artery cut.
32. External pudic artery.
33, 33. Deep femoral artery.
34, 34, 34, 34. External circumflex artery of the thigh.
35, 35, 35. Internal circumflex artery of the thigh.
36, 36. Anastomoses with the twigs of the obturator artery.

Figure II.

Shows the right foot of a man, in which the anterior peroneal artery gives off the dorsal artery of the foot.[a]

1, 1, 1. Peroneus longus muscle.
2, 2, 2. Peroneus brevis muscle.
3. Portion of the extensor longus communis digitorum muscle.
4. Portion of the extensor proprius hallucis.
5, 5, 5. Tibialis anticus.
6. Origin of the extensor brevis communis digitorum.
7. Abductor minimi digiti.
8. Tendon of the peroneus tertius.
9, 9, 9. External interossei muscles.
10. Tendon of the extensor hallucis.
11, 11, 11, 11. Tendons of the extensor longus communis digitorum.
† † Abductor hallucis.
12, 12. Anterior tibial artery unusually small.
13. Internal anterior malleolar artery.
14, 14. Anastomotic branches of the anterior tibial artery, with the dorsal artery of the foot.
15, 15. Anterior peroneal artery larger than usual, forming the dorsal artery of the foot.
16. External anterior malleolar artery.
17. Dorsal artery of the foot.
18, 18, Internal tarsal artery.
19. Great anastomosing branch with the arch of the plantar artery.
20, 20. First metatarsal artery.
21, 21. External dorsal artery of the great toe.
22. Internal dorsal artery of the second toe.
† Twig anastomosing with the plantar artery of great toe.
23, 23. External tarsal artery.

---

[a] I have seen this disposition four times.*

* I have seen this disposition several times.—T. W. J.

24. Anastomosing branch between the external and internal tarsal arteries.
25, 25, 25. Anastomosing branches, with the perforating arteries from the plantar arch.
26, 26, 26. Very large perforating branches, constituting the dorsal interosseal, or metatarsal arteries.
27. External dorsal artery of the second toe.
28. Internal dorsal artery of the third toe.
29. External dorsal artery of the third toe.
30. Internal dorsal artery of the fourth toe.
31. External dorsal artery of the fourth toe.
32. Internal dorsal artery of the fifth toe.
33, 33. External dorsal artery of the fifth toe.
34. Internal dorsal artery of the great toe.
35. Anterior dorsal artery of the great toe.
36, 36, 36, 36, 36, 36, 36, 36. Anterior dorsal branches of the toes.

Figure III.

Exhibits an unusual disposition of arteries on the posterior part of the right leg of a man twenty-seven years old.[a]

1. Tendon of the sartorius.
2. Tendon of the gracilis muscle.
3, 3. Popliteus muscle.
4, 4. Origin of the soleus.
5, 5, 5, 5. Flexor longus communis digitorum.
6, 6, 6, 6. Tibialis posticus muscle.
7, 7, 7, 7. Flexor longus hallucis.
8. Tendo Achillis.
9, 9, 9, 9, 9. Peroneus longus.
10, 10, 10, 10. Peroneus brevis.
11, 11. Tendon of the peroneus tertius.
12. Extensor communis digitorum brevis.
13. Abductor minimi digiti.
14. Plantar aponeurosis.
15. Transverse ligament of the ankle joint.
16. Popliteal artery.
17. Anterior tibial artery.
18, 18, 18. Trunk of the posterior tibial and peroneal arteries.
† Division of the trunk into posterior tibial and peroneal arteries.
19, 19, 19. Posterior tibial artery.
20. Internal posterior malleolar artery.
21, 21, 21. Posterior peroneal artery.
* Anterior peroneal artery perforating the interosseous ligament.
22, 22. External posterior malleolar artery.
23, 23, 23. Branches to the calcaneum.
24, 24. Branches to the calcaneum from the plantar artery.
25, 25. External dorsal artery of the little toe.

[a] I have observed this variety twice: once in the right leg, once in the left.

Figure IV.

Here is seen another variety of the posterior arteries of the leg in the body of a woman thirty-five years old.

1. 1, 1. Flexor longus communis digitorum.
2. 2, 2. Tibialis posticus.
3. 3, 3. Peroneus brevis.
4. Tendon of the flexor hallucis.
5. Tendon of the peroneus longus.
6. Tendo Achillis.
7. Extensor brevis communis digitorum.
8. Abductor minimi digiti.
9. Posterior tibio-fibular ligament.
10. Transverse ligament of the ankle joint.
11, 11, 11. Posterior tibial artery.
12. Anterior peroneal artery, arising from the posterior tibial.
13. Anastomosing branch with the posterior peroneal artery.
14, 14, 14. Internal posterior malleolar artery.
† Small anastomosing twigs with the posterior peroneal artery.
15, 15, 15. Posterior peroneal artery.
16, 16. External posterior malleolar artery.
17, 17. Great anastomosing branch between the peroneal and posterior tibial arteries.
18, 18, 18. Twigs to the calcaneum.

Figure V.

Shows the arteries of the inner side of the foot of a man distributed in the usual manner.

1. Soleus.
2, 2, 2. Tendo Achillis.
3, 3, 3. Tendon of the plantaris muscle.
4. Peroneus brevis.
5, 5, 5. Flexor longus communis digitorum.
6, 6, 6. Flexor longus hallucis.
7, 7. Tendon of the tibialis posticus.
8, 8, 8. Tendon of the tibialis anticus.
9. Extensor brevis communis digitorum.
10, 10, 10. Tendon of the extensor hallucis.
11, 11, 11, 11. Tendons of the extensor longus communis digitorum.
12. Flexor brevis communis digitorum.
13, 13. Abductor hallucis.
14. Internal posterior malleolar artery.
15, 15. Internal anterior malleolar artery.
16, 16, 16. Internal tarsal artery.
17, 17. Posterior tibial artery.
18, 18. Internal plantar artery.
19, 19, 19. External superficial lateral branch of the foot.
20, 20. Anastomosing twigs with the internal tarsal artery.
21, 21, 21, 21. Calcaneal branches.
22. External plantar artery.
23, 23. Internal dorsal artery of the great toe.

Fig. 1.

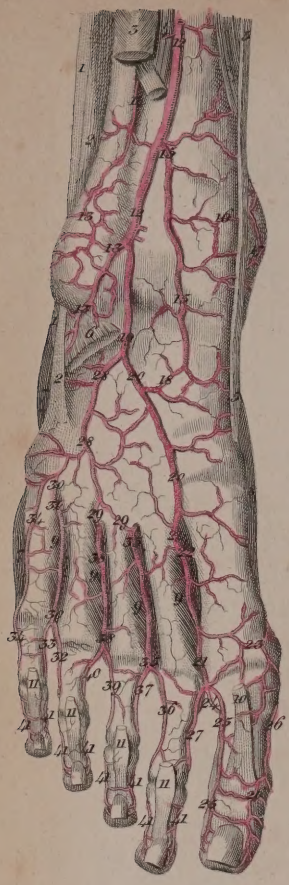


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

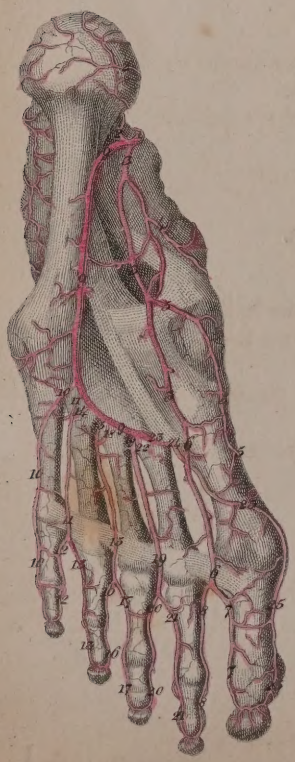


Fig. 6.

Fig. 7.

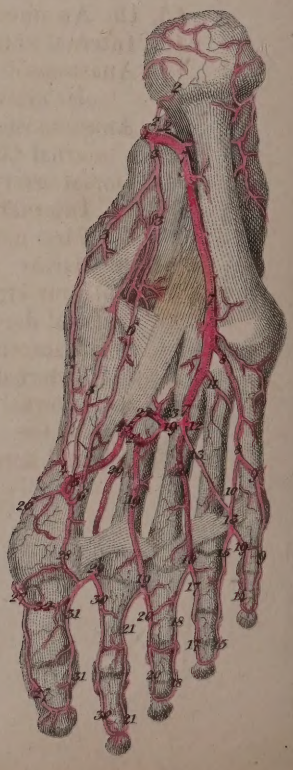


PLATE XXXVII.

Figure I.

This represents the right foot of a man forty-two years old, in which the arteries are irregularly distributed.

1, 1. Peroneus longus.
2, 2. Peroneus brevis.
3. Part of the extensor longus communis digitorum.
4. Part of the extensor proprius hallucis.
5, 5. Tibialis anticus.
6. Origin of the extensor brevis communis digitorum.
7, 7. Abductor minimi digiti.
8. Abductor hallucis.
9, 9, 9, 9. External interossei muscles.
10. Tendon of the extensor hallucis.
11, 11, 11, 11. Tendons of the extensor communis digitorum.
12, 12. Anterior tibial artery.
13, 13, 13. External anterior malleolar artery.
14. Anterior peroneal artery.
15, 15. An unusual branch.
16. Internal anterior malleolar artery.
17. Anastomosis with the internal posterior malleolar artery.
18. Anastomosis of the unusual branch with the internal tarsal artery.
19. Dorsal artery of the foot.
20, 20. Internal tarsal artery.
21, 21. First metatarsal artery.
22, 22. Great anastomosing branch with the plantar arch.
23. Internal dorsal branch of the great toe.
24. Small anterior anastomosing branch.
25, 25. External dorsal artery of the great toe.
26, 26. Internal anterior dorsal branch of the great toe.
27. Internal dorsal artery of the second toe.
28, 28. External tarsal artery.
29, 29. Anastomosing branches with the perforating arteries of the plantar, which form the second and third metatarsal arteries.
30, 30. Fourth metatarsal artery.
31. Perforating branch.
32. External dorsal artery of the fourth toe.
33. Internal dorsal artery of the little toe.
34, 34. External dorsal artery of the little toe.
35, 35. Second metatarsal artery.
36. External dorsal artery of the second toe.
37. Internal dorsal artery of the third toe.
38, 38. Third metatarsal artery.
39. External dorsal artery of the middle toe.
40. Internal dorsal artery of the fourth toe.
41, 41, 41, 41, 41, 41, 41, 41. Anterior dorsal digital branches.

Figure II.

Exhibits the regular distribution of the superficial arteries in the sole of the right foot, from the body of a man twenty-seven years old.

1. Tuberosity of the calcaneum.
2, 2, 2. Plantar aponeurosis.
3, 3, 3, 3, 3, 3, 3, 3. Transverse tendinous fibres connecting the flexor tendons.
4, 4, 4, 4. Ligamentous sheaths of the tendons.
5, 5, 5, 5, 5. Crucial ligaments.
6, 6, 6, 6, 6, 6, 6. Annular ligaments.
7, 7, 7, 7. Oblique ligaments.
8, 8. Abductor hallucis.
9. Flexor brevis hallucis.
10, 10. Abductor minimi digiti.
11, 11. Tendon of the flexor longus hallucis.
12, 12, 12, 12. Tendons of the flexor brevis communis digitorum.
13, 13, 13, 13. Tendons of the flexor longus communis digitorum.
14, 14, 14. Branches to the calcaneum.

15, 15, 15. Internal plantar artery.
16, 16, 16. Internal plantar artery of the great toe.
17, 17. Dorsal branches.
18. External plantar artery.
19, 19. External plantar artery of the little toe.
20. First plantar interosseous artery.
21. Internal plantar artery of the little toe.
22, 22. External plantar of the fourth toe.
23. Second interosseous artery.
24, 24. Internal plantar artery of the fourth toe.
25, 25. External plantar artery of the middle toe.
26. Third interosseous artery.
27, 27. Internal plantar artery of the middle toe.
28, 28. External plantar artery of the second toe.
29. Fourth interosseal artery.
30, 30. Internal plantar artery of the second toe.
31, 31. External plantar artery of the great toe.
32, 32, 32, 32, 32, 32, 32, 32. Anterior dorsal branches of the toes.
33, 33, 33, 33. Arterial arches on the third phalanx of the toes.

Figure III.

Shows the usual course of the arteries of the sole of the foot. The plantar aponeurosis is cut, and the flexor brevis communis digitorum and flexor brevis proprius pollicis removed.

1. Origin of the flexor brevis communis digitorum.
2, 2, 2, 2. Tendons of this muscle.
3, 3, 3. Abductor hallucis.
4, 4, 4, 4, 4, 4, 4, 4. Flexor longus communis digitorum.
5, 5. Musculus accessorius of the flexor longus.
6, 6, 6, 6. Flexor longus hallucis.
7, 7, 7, 7. Lumbricales muscles.
8. Internal head of the flexor brevis minimi digiti.
9. External head of the flexor brevis minimi digiti.
10, 10. Abductor minimi digiti.
11. Plantar artery.
12, 12. Branches to the calcaneum.
13, 13. Branches to the calcaneum from the posterior peroneal artery.
14, 14, 14. Internal plantar artery.
15. Anastomosis of this artery with the internal plantar artery of the great toe.
16, 16, 16. External plantar artery.
17, 17. External plantar artery of the little toe.
18, 18. First plantar digital artery.
19. Perforating branch.
† † Internal plantar artery of the little toe.
20, 20. External plantar artery of the fourth toe.
21. Second plantar digital artery.
22, 22. Internal plantar artery of the fourth toe.
23, 23. External plantar artery of the third toe.
24. Third plantar digital artery.
25, 25. Internal plantar artery of the third toe.
26, 26. External plantar artery of the second toe.
27. Fourth plantar digital artery.
28, 28. Internal plantar artery of the second toe.
29, 29. External plantar artery of the great toe.
30, 30. Internal plantar artery of the great toe.
31. Dorsal branches.

Figure IV.

Represents the deep arteries of the sole of the foot, the muscles being removed.

1. Plantar artery.
2, 2. Branches to the calcaneum.
3, 3. Branches from the posterior peroneal artery to around the calcaneum.
4, 4. Internal plantar artery.
5. Branch running to the inside of the foot.
6. Anastomosis with the internal plantar artery of the great toe.
7, 7, 7. External plantar artery forming the deep plantar arch.
8, 8, 8. External plantar artery of the little toe.
9, 9. First interosseal artery.
10. Perforating branch.
11, 11. Internal plantar artery of the little toe.
12, 12. External plantar artery of the fourth toe.
13, 13. Second interosseal artery.
14. Perforating branch.
15, 15. Internal plantar artery of the fourth toe.
16, 16. External plantar artery of the third toe.
17, 17. Third interosseal artery.
18. Perforating branch.
19, 19. Internal plantar artery of the third toe.
20, 20. External plantar artery of the second toe.
21. Great anastomotic branch of the first metatarsal artery.
22, 22. Fourth interosseal artery.
23, 23, 23. Internal plantar artery of the great toe.

24, 24. Dorsal branches of the great toe.
25, 25. Internal plantar artery of the second toe.
26, 26. External plantar artery of the great toe.
27. Anterior anastomosing branch of the first metatarsal artery.
28, 28, 28, 28, 28, 28, 28. Anastomoses on the first and second phalanges of the toes.
29, 29, 29, 29, 29. Arterial arches on the third phalanx.
30, 30, 30, 30, 30, 30, 30, 30. Dorsal branches.

Figure V.

Shows a variety of the arteries in the sole of the left foot of a woman.

1. Plantar artery.
2, 2. Calcaneal branch.
3, 3, 3. Internal plantar artery.
4. Internal lateral branch.
5, 5, 5. Internal dorsal artery of the great toe.
6, 6. Fourth plantar interosseal artery.
7, 7. External plantar artery of the great toe.
8, 8. Internal plantar artery of the second toe.
9, 9. External plantar artery.
10, 10, 10. External plantar artery of the little toe.
11, 11. First interosseal artery.
12, 12. Internal plantar of the little toe.
13, 13. External plantar artery of the fourth toe.
14. Perforating branch.
15, 15. Second Interosseal artery.
16, 16. Internal plantar artery of the fourth toe.
17, 17. External plantar artery of the middle toe.
18. Perforating branch.
19, 19. Third Interosseal artery.
20, 20. Internal plantar artery of the middle toe.
21, 21. External plantar artery of the second toe.
22. Perforating branch.
23. Communication with the great anastomosing branch of the first metatarsal artery.
24. Great anastomotic branch of the first metatarsal artery.
25, 25, 25. Internal plantar artery of the great toe.

Figure VI.

Shows another variety of the arteries in the sole of the left foot of a man.

1. Plantar artery.
2, 2. Internal plantar artery.
3. Anastomosis of this artery with the great anastomosing branch of the first interosseal.
4. Anastomosing branch with the first interosseal artery.
5. Great anastomosing branch of the first metatarsal artery, forming the deep plantar arch.
6, 6. First interosseal artery.
7, 7. Internal dorsal artery of the great toe.
8, 8. External plantar artery of the great toe.
9, 9. Internal plantar artery of the great toe.
10. Anastomosing branch with the internal dorsal artery of the great toe.
11, 11. Internal plantar artery of the second toe.
12, 12. Second interosseal artery.
13, 13. External plantar artery of the second toe.
14, 14. Internal plantar artery of the middle toe.
15. Perforating branch.
16, 16. Third interosseal artery.
17, 17. External plantar artery of the middle toe.
18, 18. Internal plantar artery of the fourth toe.
19, 19. Fourth interosseal artery.
20, 20. External plantar artery of the fourth toe.
21, 21. Internal plantar artery of the little toe.
22. Perforating branch.
23, 23. Small external plantar artery.
24, 24. First anastomosing branch with the deep plantar arch.
25, 25. Second anastomosing branch with the deep plantar arch.
26, 26. External plantar artery of the little toe.

Figure VII.

Here is seen a rare variety of the arteries of the sole of the right foot of a man.

1. Plantar artery.
2, 2. Calcaneal branches.
3, 3, 3. Internal plantar artery.
4, 4. First anastomosing branch with the plantar artery of the great toe.
5, 5. Second anastomosing branch with the plantar artery of the great toe.
6, 6. Third anastomosing branch with the plantar artery of the great toe.
7, 7, External plantar artery.
8, 8. Small trunk of the external plantar artery of the little toe, and the anastomosing branches with the first interosseal artery.
9, 9. External plantar artery of the little toe.
10, 10. Anastomosing branch.
11, 11. First perforating artery.

12. Second perforating artery.
13. First interosseal artery.
14, 14. Internal plantar artery of the little toe.
15, 15. External plantar artery of the fourth toe.
16, 16. Second interosseal artery.
17, 17. Internal plantar artery of the fourth toe.
18, 18. External plantar artery of the third toe.
19, 19, 19. Third interosseal artery.
20, 20. Internal plantar artery of the third toe.
21, 21. External plantar artery of the second toe.
22. First communicating branch with the great anastomotic branch of the first matatarsal artery.
23. Third perforating artery.
24. Second communicating branch with the great anatomosing branch of the first metatarsal artery.
25. Great anastomosing branch of the first metatarsal artery.
26. Internal dorsal artery of the great toe.
27, 27. Internal plantar artery of the great toe.
28. Branch anastomosing with the external plantar artery of the great toe.
29, 29. Fourth interosseal artery from the internal tarsal artery.
30, 30. Internal plantar artery of the second toe.
31, 31. External plantar artery of the great toe.

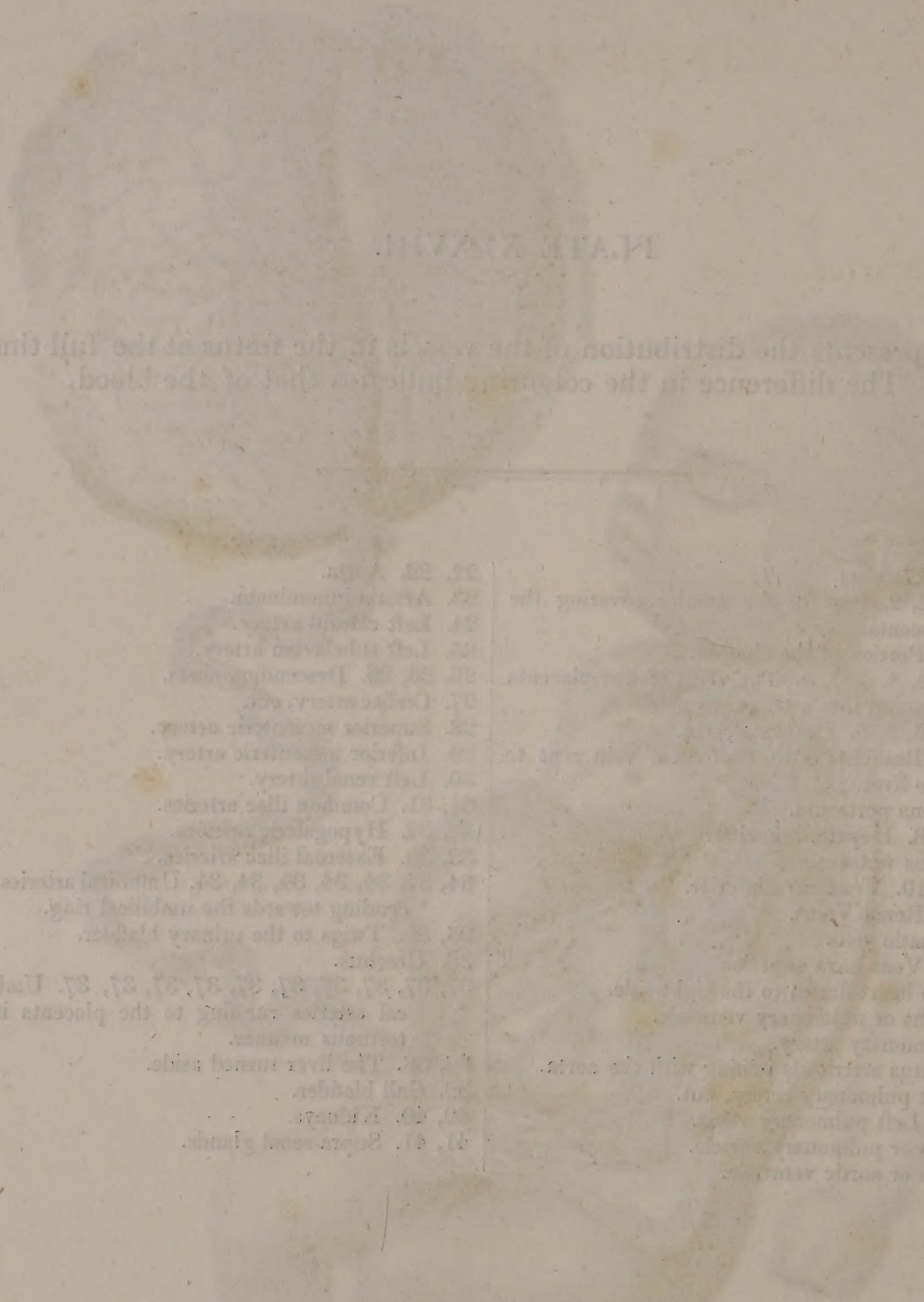
PL. XXXVIII.

E. Mitchell sculpt

PLATE XXXVIII.

This represents the distribution of the vessels in the fœtus at the full time. The difference in the colouring indicates that of the blood.

1, 1, 1. Placenta.
2, 2, 2, 2, 2. Part of the amnios covering the placenta.
3, 3, 3. Portion of the chorion.
4, 4, 4, 4, 4, 4, 4, 4. The veins of the placenta running into a trunk.
5, 5, 5, 5, 5, 5. Umbilical vein.
6, 6, 6. Branches of the umbilical vein sent to the liver.
7, 7. Vena portarum.
8, 8, 8, 8. Hepatic branches.
9. Ductus venosus.
10, 10, 10. Vena cava inferior.
11, 11. Renal Veins.
12. Hepatic vein.
13, 13. Vena cava superior.
14. The heart drawn to the right side.
15. Right or pulmonary ventricle.
16. Pulmonary artery.
17. Ductus arteriosus joining with the aorta.
18. Left pulmonary artery, cut.
19, 19. Left pulmonary veins.
20. Left or pulmonary auricle.
21. Left or aortic ventricle.
22, 22. Aorta.
23. Arteria innominata.
24. Left carotid artery.
25. Left subclavian artery.
26, 26, 26. Descending aorta.
27. Cœliac artery, cut.
28. Superior mesenteric artery.
29. Inferior mesenteric artery.
30. Left renal artery.
31, 31. Common iliac arteries.
32, 32. Hypogastric arteries.
33, 33. External iliac arteries.
34, 34, 34, 34, 34, 34, 34. Umbilical arteries ascending towards the umbilical ring.
35, 35. Twigs to the urinary bladder.
36. Urachus.
37, 37, 37, 37, 37, 37, 37, 37, 37, 37. Umbilical arteries running to the placenta in a tortuous manner.
38, 38. The liver turned aside.
39. Gall bladder.
40, 40. Kidneys.
41, 41. Supra-renal glands.



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BY DR KNOX,

LECTURER ON ANATOMY.

EDINBURGH:

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1829.

TO MY PUPILS.

GENTLEMEN,

I HAVE always been of the opinion, that the knowledge which Students generally possess of the Nerves of the Human Body, is, with few exceptions, of a kind not only less accurate than their acquaintance with the Anatomy of other parts of the frame, but, moreover, totally inadequate to enable them rightly to understand what is certainly known of the Physiology of the Nervous System, the novel and splendid views of Mr Charles Bell, or the interesting phenomena which so generally precede and follow diseases of the Nervous System.

You must be aware, Gentlemen, that this knowledge, such as it is, the Student, for the most part, attains by a hasty glance at the Dissection of the Nerves, exhibited to him during an Anatomical Course, and by a few coarse examinations of this system, conducted by himself during his practical studies, with rarely any other guide than those "Manuals" which, until lately, threatened, in this country, to take the place of complete and correct Systems of Anatomy, and thus to destroy Anatomical Science altogether.

But, to attain any thing like an extensive knowledge of the Anatomy of the Nerves from actual Dissection and personal observation, would require a degree of labour, and an expense of time, which the period usually set apart by the Student for his elementary studies does not admit of; and it is with a view to enable the industrious Student to profit to the utmost by the Dissections submitted to his inspection during any Course of Lectures delivered on the Nerves, and by an examination, even though coarsely and hastily made by himself in the Dissecting-room, that I some time ago requested Mr MITCHELL, whose talents as an Engraver and Draughtsman require no commendation from me, to engrave, in a quarto form, and at a moderate expense, the celebrated views which SCARPA gave of certain Nerves of the Human Body,—and, in the event of their being honoured with your approbation and support, to engrave, in succession,

the remaining Nerves of the Body, copied from the most celebrated Anatomists who have published, from time to time, original Monographs of the different parts of the Nervous System.

These Engravings, then, on the accuracy of which you may depend, are intended for your use, not as substitutes for the actual Inspection and Dissection of the Human Body, but simply to aid you in acquiring a knowledge of this intricate system.

They ought to be placed before you in the Dissecting Room whilst engaged in the examination of the Nerves, and carefully perused, *only* during that part of the Anatomical Course when the Dissections of the Nerves are before you. I have caused them, therefore, to be published at a rate so extremely moderate as barely to defray the expenses of the excellent Artist who undertook the work; with this special view, that no consideration as to the original cost might prevent your employing them in the only way that Anatomical Drawings or Engravings can ever be used with advantage, that is, when the parts represented are actually before you. Should I learn that any of my numerous Pupils, mistaking the object with which these Engravings have been published, should suppose them intended as a substitute for actual Dissection and Examination, I shall regret that I had sanctioned, in any shape, a Work which, if well employed, will be found of the highest practical utility to the Student, but calculated, if ill employed, to injure, by furnishing a kind of knowledge which can be of no practical utility to the Surgeon or Physician.

I have the honour to be,

GENTLEMEN,

Your much obliged and faithful Servant,

R. KNOX.

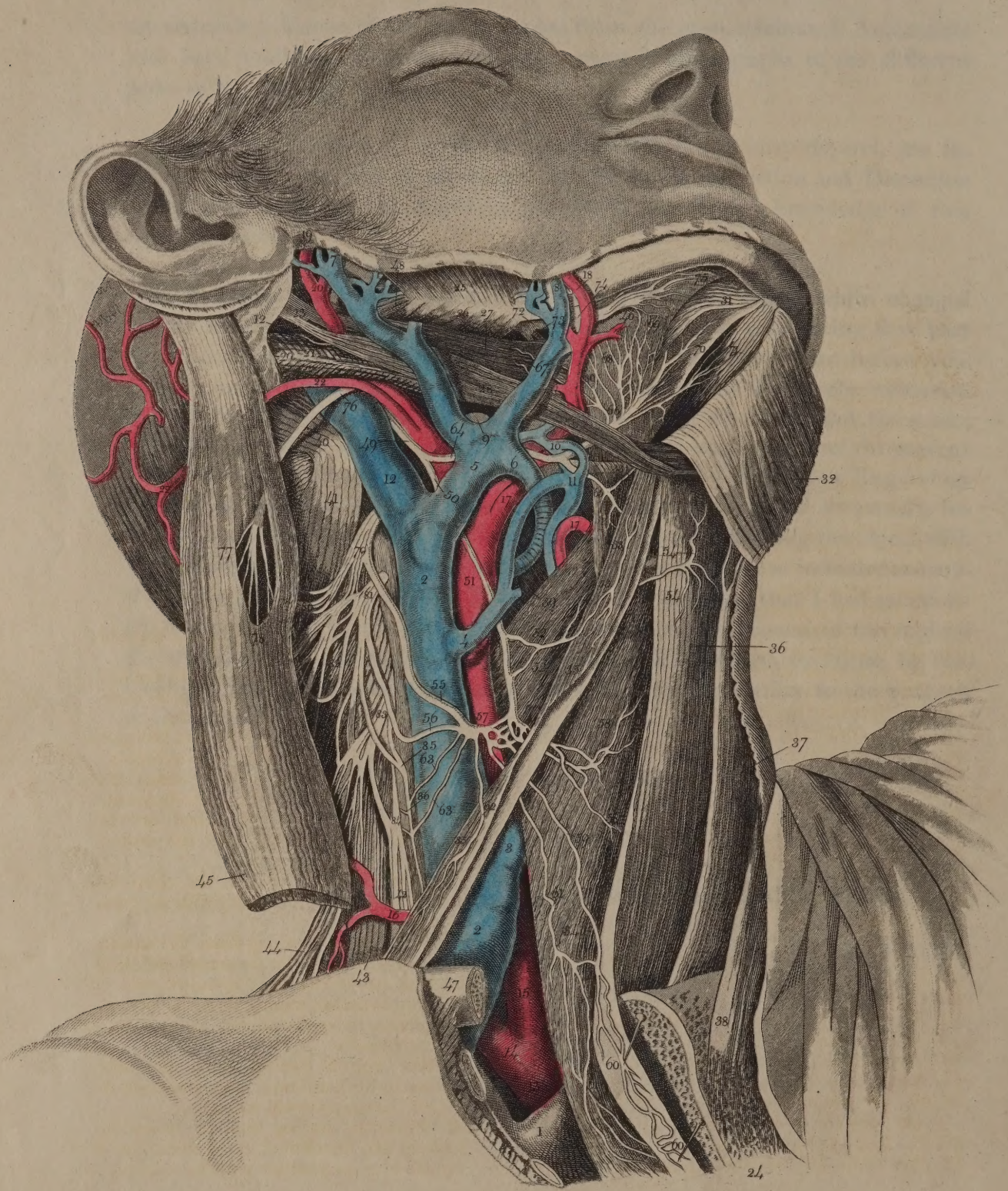
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PLATE I.

This Figure represents the Nerve of the Ninth Pair or great Hypoglossal.

No.

1. The Vena cava superior.
2. The internal jugular vein.
3. The inferior thyroid vein.
4. Pharyngeal vein.
5. Superficial trunk of the internal jugular vein.
6. Superior thyroid vein.
7. Temporal vein.
8. Facial vein.
9. Pharyngeal vein opening into the internal jugular.
10. Trunk of the deep lingual vein.
11. Anastomosis between the deep lingual and pharyngeal veins.
12. 12 Internal jugular vein.
13. Arteria innominata.
14. Right subclavian artery.
15. Right common carotid.
16. Transverse cervical artery.
17, 17. Superior thyroid artery.
18. 18 External maxillary artery.
19. Temporal artery.
20. Internal maxillary artery.
21. Auricular artery.
22. Occipital artery.
23. Styloid process of the temporal bone.
24. The sternum cut longitudinally.
25. Masseter muscle.
26. Internal pterygoid muscle.
27. Styloglossus muscle.
28. Stylo-hyoid muscle.
29. Posterior belly of the digastric muscle.
30, 30. Hyo-glossus muscle.
31. Genio-glossus.
32. The Mylo-hyoideus of the right side detached and reversed.
33. Thyro-hyoid muscle.
34. Sterno-thyroid muscle.
35, 35. Omo-hyoideus drawn aside to bring into view the nerves which penetrate it.
36, 36. Right sterno-hyoid muscle.
37. Part of the left sterno-hyoid muscle.

No.

38. Left sterno-mastoid muscle.
39. Pharynx.
40. Obliquus capitis superior.
41. Superior extremity of the levator scapulae muscle.
42. Portion of the scalenus anticus.
43. Portion of the scalenus posticus.
44. Portion of the trapezius.
45. Right sterno-mastoid, detached from the sternum.
46. Sublingual gland.
47. Right clavicle.
48. Stylo-maxillary ligament.
49. Trunk of the great hypoglossal nerve.
50. Descendens noni.
51. The same branch descending, on the common carotid artery.
52, 52. Two branches separating from the descendens, and uniting into one, which immediately redivides into two filaments.
53. One of the two preceding filaments losing itself in the upper part of the omo-hyoideus.
54, 54. The divisions of the second filament distributing themselves to the sterno-hyoideus.
55. Branch coming from the second cervical nerve, and anastomosing with the descendens noni.
56. Another branch coming from the third cervical nerve, and anastomosing with the great hypoglossal.
57. Nervous plexus resulting from the anastomosis of branches from the second and third cervical nerves with the descendens noni.
58, 58. Two branches coming from the preceding plexus, to be distributed to the sterno-thyroid muscle.
59. Another branch coming from the same plexus, to be distributed to the posterior aspect of the sterno-hyoid muscle.
60, 60. Filaments coming from the preceding branch, and distributed to the sterno-hyoid muscle near its insertion into the sternum.

No.

61, 61, 61. Another branch coming from the preceding plexus, and running on the sterno-thyroideus muscle, to which it is distributed.

62, 62. Another branch coming from the same plexus, and distributed to the lower part of the omo-hyoideus muscle.

63, 63. Two small branches coming from the fourth and fifth cervical nerves, and anastomosing with the plexus of the descendens noni.

64, 64. The trunk of the great hypoglossal nerve running towards the tongue.

65. A filament which arises from the trunk of the hypoglossal, and is distributed to the thyro-hyoideus muscle.

66. A series of nervous filaments separating from the concave side of the great hypoglossal nerve, and distributed to—

67. The stylo-glossus, and to—

68. The hyo-glossus muscle.

69. Double anastomosis of the great hypoglossal nerve, with the lingual of the fifth pair.

70. Filaments of the great hypoglossal nerve losing themselves in the genio-glossus muscle.

71. Filament of the great hypoglossal distributed to the genio-hyoideus muscle.

No.

72. Lingual nerve of the fifth pair (*gustatory.*)

73. The nervous filament, which the lingual nerve sends to the sub-maxillary gland, cut.

74. A branch which the lingual nerve sends to the sub-lingual gland.

75. A branch of the lingual nerve running between the stylo-glossus and genio-glossus muscles, to be distributed to the papillae of the tongue.

76. The spinal accessory nerve.

77. Filaments given by the spinal accessory nerve to the sterno-mastoid muscle.

78. The spinal accessory nerve running towards the shoulder, to be distributed to the trapezius muscle.

79. Second cervical nerve.

80. Anastomosis between the spinal accessory and the second cervical nerve.

81. Third cervical nerve.

82. Anastomosis between the third cervical and the spinal accessory nerve.

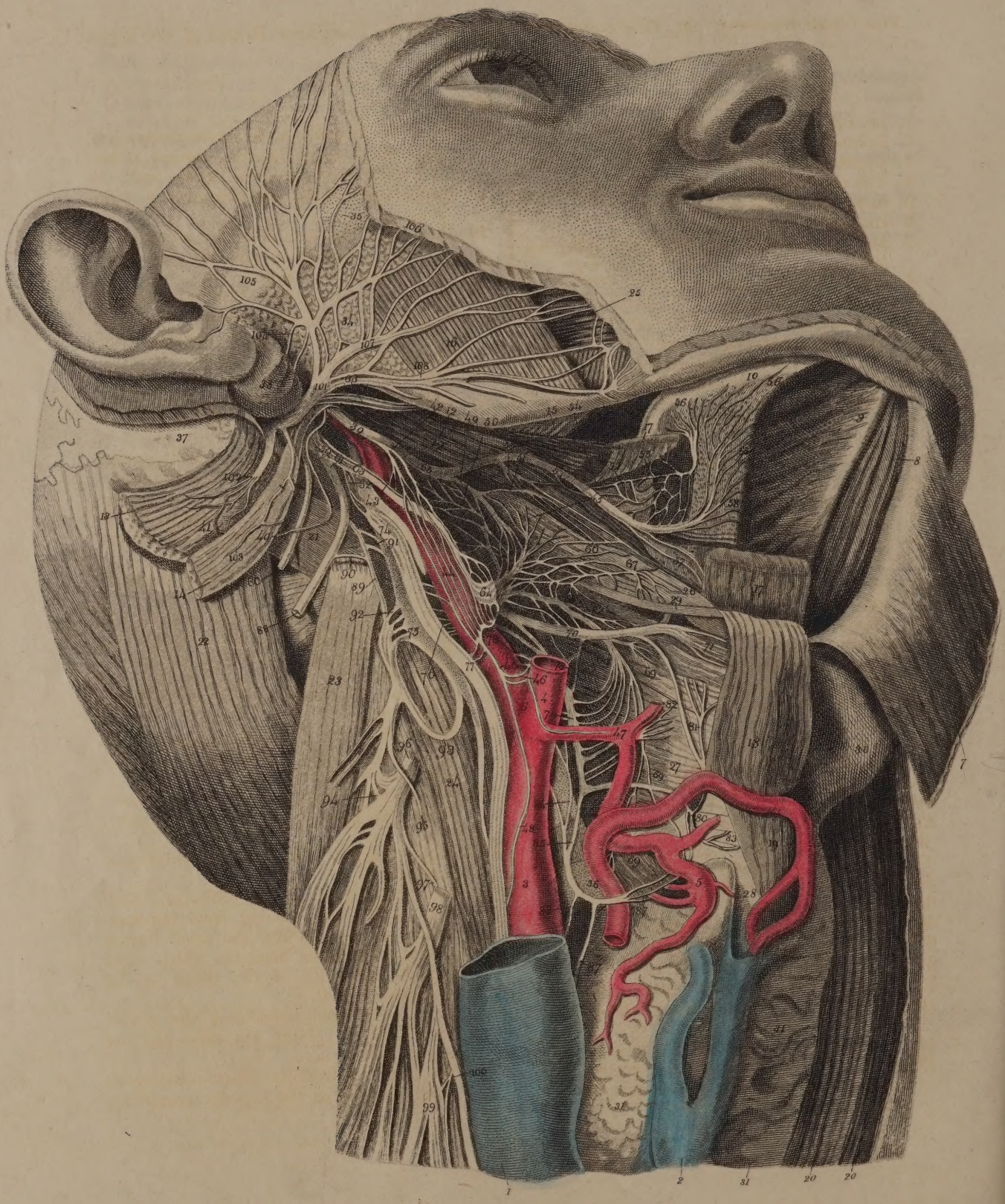
83. Fourth cervical nerve.

84. Fifth cervical nerve.

85, 85. Phrenic nerve.

86. Third root of the phrenic nerve arising from the fifth cervical nerve.

PL. II.



P. Mitchell. sculpt.

PLATE II.

This Figure represents the Glosso-pharyngeal Nerve, and the Pharyngeal Branch of the Eighth Pair,—Right side.

No.

1. Internal jugular vein cut.
2. Inferior thyroid vein.
3. Common carotid artery.
4. The cut trunk of the external carotid artery.
5. Superior thyroid artery.
6. Internal carotid artery.
7. Mylo-hyoideus muscle, detached and thrown aside.
8. Genio-hyoideus muscle.
9. Genio-glossus muscle.
10. The tongue.
11. Stylo-glossus muscle.
12. The stylo-pharyngeus muscle thrown aside, so as to expose the glosso-pharyngeal nerve which is below it.
13. Posterior belly of the digastric muscle, cut and thrown aside.
14. Portion of the stylo-hyoideus muscle.
15. Internal pterygoid muscle.
16. Masseter muscle.
17. The hyo-glossus muscle, cut.
18. Thyro-hyoid muscle.
19. Crico-thyroid muscle.
20, 20. Left sterno-hyoid and sterno-thyroid muscles.
21. Obliquus capitis superior.
22. Splenius muscle.
23. Levator scapulae.
24. Rectus capitis anticus major.
25. Buccinator muscle.
26. Superior constrictor.
27. Middle constrictor, and
28. Inferior constrictor of the pharynx.
29. Right horn of the os hyoides.
30. Thyroid cartilage.
31. Thyroid body.
32. Right tonsil.
33. Styloid process and stylo-maxillary ligament.
34. Portion of the parotid.
35. Zygomatic process.
36. Cervical intervertebral cartilages.
37. Mastoid process.
38. Cartilaginous portion of the auditory canal.
39. Trunk of the glosso-pharyngeal nerve.
40. First branch of the preceding nerve, anastomosing with—
41. The digastric filament of the facial nerve.
42. Another branch of the glosso-pharyngeal, anastomosing with the pharyngeal filament of the pneumo-gastric nerve.

No.

43. Other two filaments of the glosso-pharyngeal, descending on the internal carotid artery, and anastomosing in their course with the nervi molles of the superior cervical ganglion.
44. Two other filaments of the same nerve uniting with the ganglion and the pharyngeal plexus of the par vagum.
45. Nervous cord, formed of several filaments coming from the glosso-pharyngeal nerve and the nervi molles of the superior cervical ganglion.
46. Branch coming from the anastomosis of the filaments of the nervi molles and glosso-pharyngeal, and placed on the divisions of the carotid artery.
47. Filament coming from the preceding nerves, and placed on the superior thyroid artery.
48. Another filament coming from the same origin, and descending on the common carotid artery, to be united to the superficial cardiac nerve.
49. Small branch of the glosso-pharyngeal uniting to—
50. The pharyngeal plexus of the par vagum, which is distributed to the superior constrictor muscle of the pharynx, and to—
51. Other filaments of the glosso-pharyngeal which are distributed to the stylo-pharyngeus muscle.
52. Filaments of the glosso-pharyngeal, which are lost in the stylo-pharyngeus and superior constrictor muscles.
53. Small external lingual branch of the glosso-pharyngeal (*ramus lingualis minor exterior.*)
54. Another lingual branch of the glosso-pharyngeal.
55. Tonsillary circular plexus, (*circulus tonsillaris Anderschii,*) coming from the anastamosis of filaments from the small lingual branch, with other filaments which come from the concavity of the trunk of the glosso-pharyngeal.
56, 56. Lateral lingual branches of the glosso-pharyngeal, supplying the sides and the base of the tongue.
57. Two filaments from the glosso-pharyngeal, which are lost in the superior constrictor

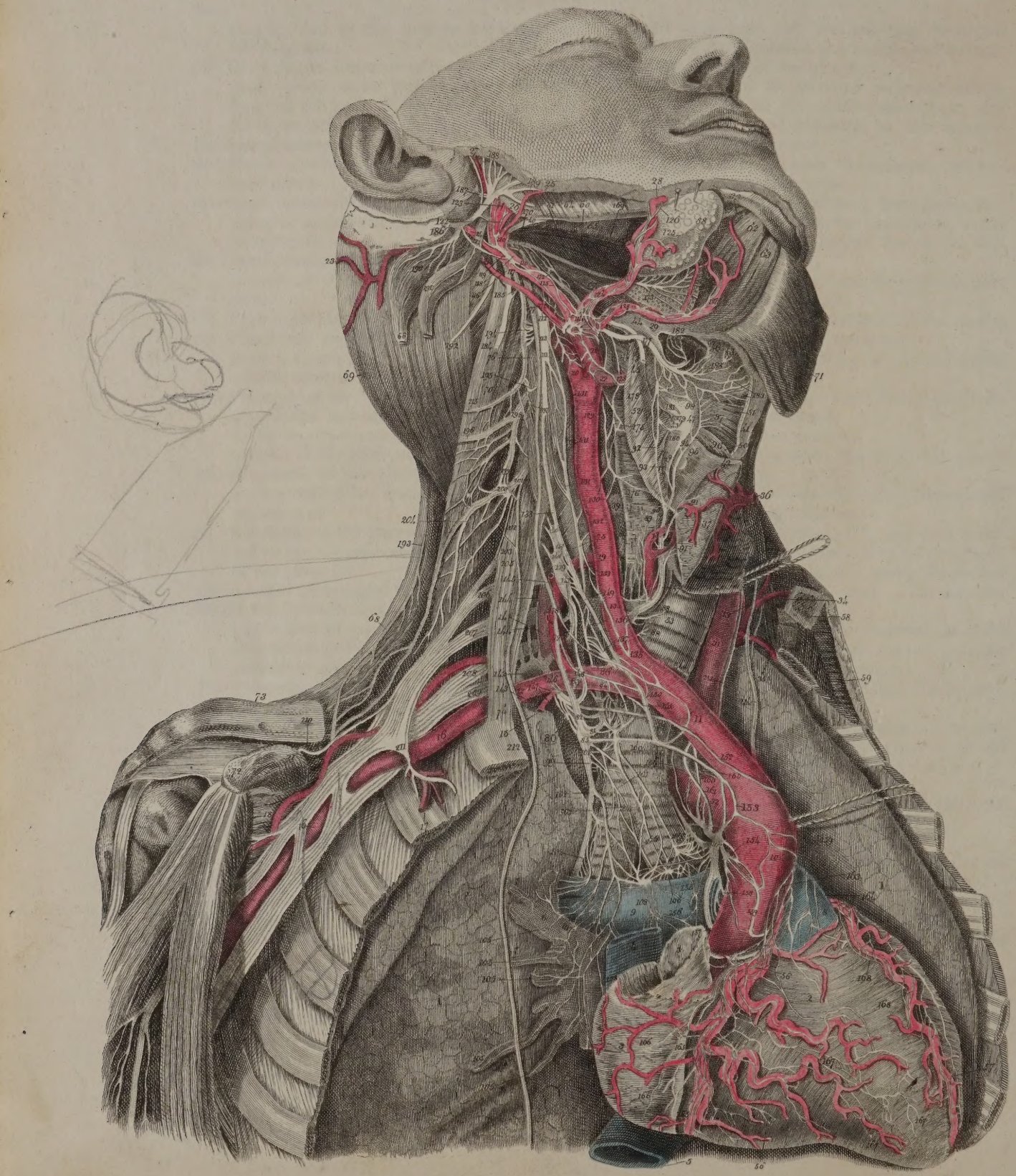
No.

muscle, and in the mucous membrane of the epiglottis.

58. Deep lingual branches of the glosso-pharyngeal, going to be distributed on the surface of the base of the tongue, about as far as an inch before the foramen cœcum.
59. Spinal accessory nerve.
60. Great external branch of the spinal accessory nerve
61. Small internal branch of the accessory nerve, going to unite with the origin of the glosso-pharyngeal.
62. Anastomosis between the small internal branch of the accessory and the par vagum.
63. Pharyngeal branch of the pneumo-gastric.
64. Plexiform expansion of the pharyngeal branch supplying the superior part of the middle constrictor.
65. Pharyngeal nerve coming from the preceding plexus, and ascending to be distributed to the superior constrictor muscle and the summit of the pharynx.
66. Filaments of the pharyngeal nerve anastomosing with other filaments of the glosso-pharyngeal.
67. Filaments of the pharyngeal nerve distributed to the superior and middle constrictors of the pharynx.
68. Another pharyngeal branch descending.
69, 69, 69. Penicilliform filaments of the descending branch of the pharyngeal nerve, losing themselves in the middle and inferior constrictor muscles.
70. Anastomosis of the pharyngeal nerve, with the external laryngeal branch of the great sympathetic.
71. Internal laryngeal branch of the pneumo-gastric.
72. Anastomosis of the internal laryngeal nerve with the glosso-pharyngeal.
73. Anastomosis of the internal laryngeal nerve with the nervus mollis of the cervical ganglion.
74. Trunk of the pneumo-gastric nerve.
75. Superior cervical ganglion.
76. Nervi molles arising from the superior cervical ganglion.
77. Two filaments of the preceding nerves descending on the internal carotid artery, and anastomosing with the filaments of the glosso-pharyngeal nerve.
78. Two nervi molles which come from the superior cervical ganglion, and form, with a filament of the internal laryngeal nerve, the origin of the external laryngeal nerve.
79. External laryngeal nerve.

No

80, 80. Filaments of the external laryngeal nerve distributed to the middle and inferior constrictors of the pharynx.
81. A branch of the external laryngeal nerve, distributed to the middle constrictor, and sending several filaments to the internal part of the larynx.
82. Anastomosis between the internal and external laryngeal nerves.
83. A branch of the external laryngeal nerve, distributed to the inferior constrictor, to the internal part of the larynx, and to the thyroid gland.
84. Nervi molles coming from the inferior part of the cervical ganglion.
85. Anastomosis of the inferior nervi molles with the external laryngeal nerve.
86. Nervi molles, extending to the superficial cardiac nerve.
87, 87. Filaments of the nervi molles penetrating the thyroid gland.
88. Great hypoglossal nerve.
89. Anastomosis between the first and second cervical nerves.
90. Anastomosis between the great hypoglossal and the first cervical nerve.
91. Two branches furnished by the first cervical nerve to the superior cervical ganglion.
92. A short and large branch which the second of the cervical nerves sends to the superior cervical ganglion.
93. Branch coming from the anastomosis of the second and third cervical nerves, entering the superior cervical ganglion.
94. Anastomosis of the second and third cervical nerves.
95. Branch of the second cervical nerve, anastomosing with the descending branch of the great hypoglossal *(descendens noni.)*
96. Third cervical nerve.
97. Anastomosing branch between the third cervical nerve and the descendens noni.
98. Fourth cervical nerve.
99. Fifth cervical nerve,—commencement of the brachial plexus.
100. Phrenic nerve.
101. Facial nerve.
102. Branch furnished by the facial nerve to the digastric muscle.
103. Branch furnished by the facial nerve to the stylo-hyoideus.
104. Branch of the auricular nerve anastomosing with the facial nerve.
105. Temporal branch.
106. Superior facial branch.
107. Middle facial branch ; and,
108. Inferior facial branch of the facial nerve.



E. Mitchell sculp.t

PLATE III.

Representing the Cardiac Nerves of the Right Side.

No.
1. The lungs separated from one another.
2. Anterior aspect of the heart.
3. Right auricle of the heart.
4. Vena cava superior.
5. V. cava inferior.
6. Right deep pulmonary veins.
7. Superficial pulmonary veins.
8. Trunk of the pulmonary artery.
9. Right pulmonary artery.
10. Aorta drawn towards the left.
11. A. innominata.
12. Right subclavian artery.
13. Right inferior thyroid artery.
14. Vertebral artery.
15. Internal mammary artery.
16. Axillary artery.
17. External mammary artery.
18 Deep scapular artery.
19. Right carotid artery.
20. Internal carotid artery.
21. External carotid artery.
22. Superior thyroid artery cut.
23. Occipital artery.
24. Posterior auricular artery.
25. Transverse artery of the face.
26. Internal maxillary artery.
27. Superficial temporal artery.
28. Facial artery.
29. Lingual artery.
30. Sublingual gland.
31. Left carotid artery.
32. Arch of the aorta.
33. Origin of the left inferior thyroid.
34. Common origin of the transverse, cervical, and scapular arteries.
35. Left internal mammary artery.
36. Right superior thyroid artery, cut.
37. Right lobe of the thyroid gland, thrown aside.
38. Sub-maxillary gland.
39. Bodies of the cervical vertebrae.
40. Stylo-maxillary ligament.
41. Right portion of the thyroid cartilage, cut.
42. Cricoid cartilage.
43. Mucous membrane of the larynx.
44. Right horn of the hyoid bone.

No.
45. Summit of the great horn of the thyroid cartilage, cut.
46. Epiglottis.
47. Right arytenoid cartilage, and corresponding arytenoid gland.
48. Arytenoid muscle.
49. Posterior crico-arytenoid muscles.
50. Lateral crico-arytenoid muscle.
51. Thyro-arytenoid muscle.
52. Pharynx.
53. The trachea inclined to the left, with the pharynx.
54. Right bronchus.
55. Left bronchus.
56. Right coronary artery.
57. Branch of the posterior coronary artery.
58. Portion of the left clavicle.
59. Portion of the pectoralis major.
60. Stylo-glossus muscle.
61. Stylo-pharyngeus muscle.
62. Genio-glossus muscle.
63. Genio-hyoideus muscle.
64. Masseter muscle.
65. Internal pterygoid muscle.
66. Posterior belly of the digastric.
67. Portion of the stylo-hydoideus muscle.
68. Portion of the trapezius muscle.
69. Portion of the splenius muscle.
70. Levator scapulae.
71. Mylo-hyoideus muscle detached and thrown aside.
72. Coracoid process.
73. Portion of the clavicle.
74. Scalenus anticus muscle.
75. Longus colli.
76. Rectus capitis anticus major.
77. Par vagum drawn outwards.
78. Superficial cardiac branch of the par vagum.
79. Another superficial cardiac branch of the par vagum, which is joined in the thorax with the great cardiac nerve of the sympathetic.
80. Filaments coming from the inferior cervical ganglion, and from the first thoracic ganglion, and anastomosing with the trunk of the pneumogastric.

No.

81. Origin of the recurrent nerve.
82. Branch coming from the inferior cervical ganglion and from the first thoracic ganglion, to be united to the recurrent nerve.
83. Anastomosis of the recurrent nerve, with a branch of the middle cervical ganglion.
84. Ascending branches of the recurrent nerve.
85. Descending branches of the recurrent nerve.
86. The recurrent nerve ascending towards the trachea behind the subclavian artery.
87. The recurrent nerve ascending below the trunk of the inferior thyroid artery, and embracing its branches.
88. Fasciculi of filaments of the recurrent nerve going to be distributed to the mucous membrane of the trachea.
89. Filaments of the recurrent nerve distributed to the pharynx and to the commencement of the oesophagus.
90. Other filaments of the same nerve distributed to the inferior constrictor muscle of the pharynx.
91. Other filaments of the same nerve which penetrate the thyroid gland and the trachea.
92. Branch of the recurrent nerve which establishes the principal anastomosis between this nerve and the internal branch of the superior laryngeal branch of the pneumo-gastric.
93. Filaments of the recurrent nerve distributed to the crico-arytenoideus posticus muscle.
94. Branch of the recurrent nerve, whose filaments partly anastomose with those of the internal branch of the superior laryngeal nerve, and are partly lost in the arytenoideus muscle.
95. Filament of the recurrent nerve distributed to the arytenoid gland and to the mucous membrane of the larynx.
96. Two filaments of the recurrent nerve distributed to the lateral crico-arytenoid muscle.
97. Filaments of the recurrent nerve distributed to the fibres of the thyro-arytenoideus muscle.
98. Filaments of the recurrent nerve anastomosing with the deep filaments of the superior laryngeal nerve.
99. Trunk of the right par vagum.
100. Anastomosis between the descending branches of the recurrent nerve and the great cardiac branch of the sympathetic.
101. Filaments coming from the trunk of the pneumo-gastric and the descending branches of the recurrent, and going to throw themselves into the anterior pulmonary plexus.

No.

102. Nervous filaments which the trunk of the pneumo-gastric furnishes to the œsophagus, and to the right bronchus.
103. Branch of the pneumo-gastric penetrating the lung with the pulmonary artery.
104. Branch of the pneumo-gastric, which enters extensively into the formation of,
105. The right superficial pulmonary plexus.
106. Small anterior pulmonary plexus of the pneumo-gastric.
107. Filaments of the cardiac ganglion of the great sympathetic which unite with filaments of the pneumo-gastric to enter along with the right pulmonary artery into the corresponding lung.
108. Filament of the anterior pulmonary plexus of the pneumo-gastric, and of the great cardiac nerve, which embraces the pulmonary artery in the form of an arch, *(loop.)*
109. Anastomosis of the left recurrent nerve, with the anterior pulmonary plexus of the right pneumo-gastric.
110. Great sympathetic nerve emerging from the carotid canal.
111. Superior cervical ganglion.
112. Two soft nerves coming from the preceding ganglion.
113. Two other soft nerves proceeding from the middle part of the same ganglion.
114. Bundles of soft nerves embracing the trunk of the external carotid artery.
115. Three of the soft nerves ascending upon the external carotid artery.
116. Gangliform enlargement of the soft nerves which accompany the external carotid artery.
117. A soft nerve uniting itself to the preceding ganglion.
118. Twig from the soft nerves which is reflected behind the external carotid.
119. Branch of the facial nerve which anastomoses with the preceding ganglion of the nervi molles.
120. Branches coming from the preceding ganglion of the nervi molles, and following the facial branches of the external carotid.
121. Twig of the soft nerves accompanying the posterior auricular artery and anastomosing with the facial nerve.
122. Two branches of the soft nerves accompanying the internal maxillary.
123. Anastomosing branch between the soft nerves and the facial nerve.
124. Soft nerves from the superior cervical ganglion, accompanying the facial artery.
125. Soft nerve penetrating the submaxillary gland.

No.
126. Soft nerves proceeding to anastomose with twigs from the facial nerve.
127. Soft nerves accompanying the lingual artery.
128. Soft nerves accompanying the superior thyroid artery.
129. Soft nerves which concur to form with the pneumo-gastric the external laryngeal nerve.
130. Two branches of the external laryngeal nerve which proceed to the superficial cardiac plexus.
131. Soft nerves coming from the inferior part of the superior cervical ganglion to form
132. The superficial cardiac nerve.
133. Branch of the superficial cardiac nerve dividing into three portions.
134. Twigs of the preceding branch accompanying the inferior thyroid artery to be lost in the gland of the same name.
135. The two other twigs of the same branch going to the anterior cardiac plexus.
136. Superficial cardiac nerve.
137. Branch of the right recurrent nerve concurring to form the preceding nerve.
138. The great sympathetic nerve.
139. Middle cervical ganglion.
140. Three branches coming from the third, fourth, fifth cervical nerves to be united to the middle cervical ganglion.
141. Deep trunk of the middle cervical ganglion, dividing into two branches which embrace the vertebral artery, to terminate in—
142. The inferior cervical ganglion.
143. First thoracic ganglion.
144. Branches furnished by the three inferior cervical nerves, and proceeding to the inferior cervical ganglion.
145. Branch of the middle cervical ganglion passing before the subclavian, and dividing into many branches.
146. Twig from the preceding branch proceeding to the inferior cervical ganglion.
147. Another twig from the same branch sending filaments to the inferior cervical ganglion, to the first thoracic ganglion, and to the internal mammary artery.
148. Another branch going to the inferior cervical ganglion, and to the first thoracic ganglion.
149. A branch which comes from the middle cervical ganglion, to unite with the superficial cardiac nerve, and to anastomose with the recurrent nerve.
150. Great deep cardiac nerve of the trisplanchnic.
151. Descending branch of the recurrent nerve anastomosing with the preceding nerve.
152. Another cardiac nerve (cardiacus aortae superficialis—SCARPA.)

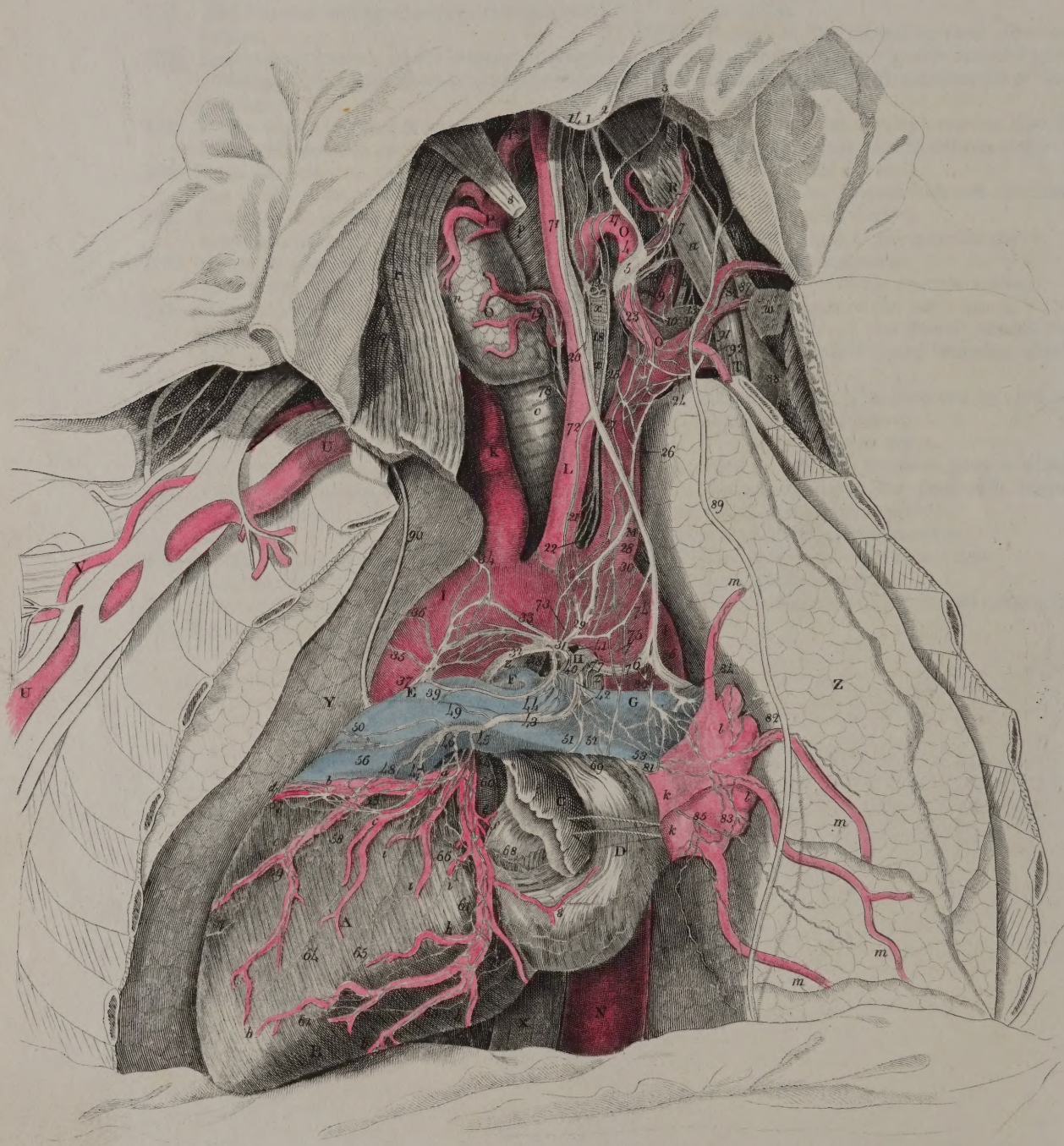
No.
153. Great cardiac nerve passing under the arch of the aorta.
154. Soft ganglion of the deep cardiac nerve.
155. Branch of the cardiac ganglion passing behind the pulmonary artery, to be distributed to the posterior surface of the heart.
156. Twig from the cardiac ganglion, anastomosing with those of the pulmonary plexus, and forming with them a net-work, the filaments of which embrace the pulmonary artery, and are distributed to the superior vena cava, the auricles, and to the flat surface of the heart.
157. Soft branches arising from the cardiac ganglion, and proceeding towards the posterior coronary artery.
158. Branches of the cardiac ganglion proceeding towards the anterior coronary artery.
159. Deep cardiac nerves going to enlarge the plexus of the anterior coronary artery.
160. Small deep cardiac nerves of the left side arising from the inferior cervical ganglion, and the corresponding first thoracic ganglion to be united to the right great cardiac nerve.
161. Left superficial cardiac nerve.
162. Anastomosis between the trunks of the cardiac nerves of each side.
163. Right coronary plexus.
164. Twigs from the left cardiac nerves proceeding to the anterior coronary plexus.
165. Filaments of the anterior coronary plexus accompanying the branches of the corresponding coronary artery.
166. Twigs of the anterior coronary plexus accompanying the small arteries of the right auricle.
167. Branches of the same plexus distributing themselves to the anterior face of the heart.
168. Twigs of the left coronary plexus, which accompany the anterior branch of the posterior coronary artery.
169. Glosso-pharyngeal nerve.
170. Pharyngeal branch of the par vagum.
171. Anastomosis of branches of the glosso-pharyngeal nerve and pharyngeal twigs, the soft branches of the superior cervical ganglion.
172. The pharyngeal nerve passing towards the pharynx.
173. Distribution of the glosso-pharyngeal nerve upon the tonsils and base of the tongue.
174. Branch of the internal laryngeal nerve, uniting to form the external laryngeal, with some branches of the superior cervical ganglion.
175. Branch of the external laryngeal nerve distributing itself upon the constrictor muscles of the pharynx, and upon the inside of the larynx.

No.

176. Twigs of the preceding nerve distributing themselves upon the inferior constrictors of the pharynx, on the larynx, and thyroid gland.
177. The internal laryngeal nerve passing into the larynx.
178. Descending branch of the internal laryngeal nerve passing to anastomose with the recurrent nerve.
179. Twigs of the internal laryngeal nerve distributing themselves upon the arytenoid gland.
180. Small branches of the same nerve terminating on the arytenoid muscles.
181. Branches of the same nerve passing to the arytenoid gland.
182. Twigs of the same nerve going to the epiglottis and to the gland of the epiglottis.
183. Other branches of the same nerve distributing themselves upon the mucous membrane of the larynx and neighbouring parts.
184. The great hypoglossal nerve cut and laid aside.
185. Anastomosis of the preceding nerve with the first and second cervical nerves.
186. Facial nerve.
187. Anastomosis of the facial nerve with the auricular branch of the inferior maxillary nerve.
188 & 189. Temporal and facial branches of the facial nerve.
190. Digastric branch of the facial nerve.
191. Stylo-hyoid branch of the same nerve.

No.

192. Spinal nerve cut.
193. Inferior portion of the spinal nerve.
194. Anastomosing branch between the two first cervical nerves and the superior cervical ganglion.
195. Branch of the second cervical nerve passing to unite with the superior cervical ganglion.
196. Branch of the third anastomosis of the cervical nerves.
197. Branch of the cervical nerves distributed upon the rectus capitis anticus major.
198. Third cervical nerve.
199. Anastomosing branch between the third and fourth cervical nerves.
200. Superior origin of the phrenic nerve.
201. Fourth cervical nerve.
202. Second origin of the phrenic nerve.
203. Inferior origin of the same nerve.
204. Deep branch of the fourth anastomosis of the cervical nerves, and branches which pass from it.
205, 206, 207, 208. The four last cervical nerves.
209. The first dorsal nerve.
210. The infra-scapular nerve.
211. Branches of the brachial plexus which are distributed upon the pectoralis major and serratus magnus muscles.
212. Trunk of the phrenic nerve.
213. The par vagum of the left side.
214. Left phrenic nerve.
215. Occipital branch of the second cervical nerve.



S. Mitchell sculpt

PLATE IV.

Cardiac Nerves of the Left Side.

A—The convex margin of the heart, much drawn from the left to the right side, and rolled back.

Vesalius has a Plate in which there is the same disposition of the heart and lungs as in ours. *De ff. O. Tabr. Lib.* vi. *Fig.* vi.

B—Part of the plane surface of the heart.

C—The left or posterior auricle of the heart, raised and purposely suspended, that the first principal and *posterior* branch of the *posterior* coronary artery, and the nerves accompanying it, which the auricle covers through great part of its course, may be seen.

D—Sinus of the pulmonary veins.

E—Trunk of the pulmonary artery, purposely reflected upon itself, and folded back, that the remarkable cardiac nerves of the left side, which, adhering to this artery, run along its posterior surface, might be more advantageously exposed.

F—Commencement of the right branch of the pulmonary artery.

G—Left branch of the pulmonary artery.

H—Ligamentum arteriosum.

I, I—Arch of the aorta.

K—Arteria *innominata*, or common trunk of the right subclavian and right carotid.

L—Left carotid artery.

M—Left subclavian artery.

N—Thoracic aorta.

O, O, O—Inferior thyroid artery.

P, P—Superior thyroid artery.

Q—Vertebral artery.

R—External cervical artery, a branch of the inferior thyroid artery.

S—Transverse artery of the neck.

T—Internal mammary artery.

U, U—Right brachial artery.

V, V—Deep scapular artery.

X—Œsophagus.

Y—Right Lung.

Z—Left lung.

a—Trunk of the posterior coronary artery, which, directly emerging from the aorta, and covered through part of its course by the trunk of the pulmonary artery, is immediately reflected to the left or posterior surface of the heart.

b,—The first principal and anterior branch of the posterior coronary artery, which,

c, *c*—When it has proceeded for a short distance upon the convex margin of the heart,

d—Is carried forward, and running upon the anterior region of the heart, follows almost the direction of the septum of the ventricles.

The other principal and posterior branch of the great or posterior coronary artery, which, after passing over the convex margin of the heart, runs backward between the auricle and the sinus of the pulmonary veins, to gain the plain surface of the heart, runs backwards between the auricle and the sinus of the pulmonary veins.

b—Small arteries running to the posterior auricle of the heart.

g—One of the principal arteries of the sinus of the pulmonary veins.

h, *h*, *h*, *h*—Branches of the posterior branch of the left coronary artery running behind the convex margin of the heart to the plain surface of this viscus.

i, *i*. *i*.—Branches of the left coronary artery shortly after their origin, proceeding to the base of the heart.

k, *k*—Principal trunks of the pulmonary veins of the left side.

l, *l*—Deep pulmonary veins.

m, *m*, *m*, *m*—Superficial pulmonary veins.

n—Left horn or lobe of the thyroid gland.

o—Trachea.

p—Part of the pharynx.

q—Part of the left sterno-thyroid muscle.

r—Portion of the left sterno-hyoid muscle.

s—Left coraco-hyoid muscle cut.

t—Commencement of the rectus capitis anticus major muscle.

u—Scalenus anticus muscle of the left side.

v—Portion of the scalenus posticus.

w—Left clavicle.

x, *x*—Vertebrae of the neck.

y—Longus colli muscle.

z, *z*—Bronchia.

No.

1. Left intercostal nerve.
2, 3. Branches of the third pair of cervical nerves proceeding to the intercostal.
4. Trunk of the intercostal nerve, where it passes over the inferior thyroid artery.
5. Middle cervical ganglion of the intercostal nerve; or, as some call it, thyroid ganglion.

   The figure and size of this ganglion varies remarkably in different subjects, and is even sometimes different in the opposite side of the same body.
6. Fourth cervical nerve.
7. Nerves sent from the fourth cervical nerve to the middle cervical ganglion.
8. Deep-seated twigs from the fourth and fifth cervical nerves, running behind the inferior thyroid artery, to the middle cervical ganglion.
9, 10. Two strong branches proceeding from the internal-lateral and inferior region of the middle cervical ganglion, which, hooking round the vertebral artery, proceed to the middle cervical ganglion.
11. Inferior cervical ganglion.
12. Thickish branches of nerves running to the inferior cervical ganglion, from the fourth, fifth, and sixth cervical nerves.
13 A nervous filament, inserted into the inferior cervical ganglion, from the last cervical and first dorsal nerves.
14. Small nervous fibrillae of the superior cervical ganglion of the great intercostal, which form the commencement of the left superficial cardiac nerve.
15, 16, 17. Origins of the left superficial cardiac nerve, and other additions derived from the trunk of the intercostal nerve below the superior cervical ganglion.
18 Trunk of the left superficial cardiac nerve. We agree with Haller that this nerve is very rarely wanting on the left side.
19. Anastomosis between the origins of the superficial cardiac nerve, derived from the superior cervical ganglion, and those proceeding from the trunk of the sympathetic, to enlarge this superficial cardiac nerve.
20. Anastomosis observed to exist in this subject between the superficial cardiac and trunk of the eighth pair.

   We have very seldom indeed, observed this communication.
21. Filament of the superficial cardiac nerve, which, crossing above the arch of the aorta, is partly joined to the cardiac branch of the eighth pair, and partly to the other deep cardiac nerve of the sympathetic.

No.

22. Superficial cardiac nerve, gliding high up behind the aorta to the great deep cardiac plexus.
23. Soft pulpy nervous twigs, proceeding from the middle cervical ganglion, some of which supported by the trunk of the inferior thyroid artery, and others by the vertebral artery, run towards the left subclavian artery.
24. A remarkable hoop or circle, formed by the nerves of the middle cervical ganglion, proceeding to the inferior cervical and first thoracic ganglion, by which the subclavian artery is surrounded.
25. Another noose upon the subclavian artery, formed by a conspicuous nerve of the inferior cervical ganglion, uniting with the other left cardiac nerve of the great intercostal.
26. Another smaller deep cardiac nerve of the sympathetic of the left side, originating by many branches from the inferior and middle cervical ganglia.

   I may remark, that this nerve sometimes proceeds behind the aorta to the great deep cardiac plexus, sometimes distinctly as a single twig, at other times double, and occasionally in a triple form.
27. Another smaller deep cardiac branch, sent off from the middle cervical ganglion.
28. Gangliform swelling of the small deep cardiac nerve.
29. Situation where the small deep cardiac nerve collects its own filaments and those of the accompanying nerves upon the posterior surface of the aorta, transmitting them to the great deep cardiac plexus; to which
30. A small filament is added from the inferior cervical ganglion, which, covered through great part of its course by the subclavian artery, ascends directly over the arch of the aorta.
31. Great deep cardiac plexus. This plexus is formed by the anastomosis between the cardiac nerves of both sides, in a manner similar to that by which the splanchnic nerves, immediately under the diaphragm, unite to form the superior mesenteric plexus.

   Haller speaks in the following manner of the formation of the great deep cardiac plexus: "Certainly some nerves, principally cardiac, originating from the superior, middle, and inferior cervical ganglion, and running behind the aorta, compose the great cardiac plexus situated on the anterior surface of the left branch of the trachea, behind the aorta, and above the pulmonary artery, to

No.

the right of the ductus arteriosus. Branches from the right side contribute to the formation of this plexus. From this plexus the nerves of the heart always proceed in three directions to their different terminations."—*Elem. Physiol.* Lib. VI. Sect. III. § XXV.

32. Cardiac ganglion of WRISBERG.

33. A reticulated bundle of nerves formed by filaments from the great deep cardiac plexus, which, running between the aorta and the pulmonary artery, and receiving distinct branches from the cardiac ganglion of WRISBERG, proceeds to the anterior coronary artery and the anterior surface of the heart.

34. Anastomosis between the small cardiac nerve of the right side, or superficial cardiac nerve of the aorta, and the net-work of the great deep cardiac plexus.

35, 36. Filaments of the deep cardiac nerve of the right side, proceeding to the nervous net-work of the great deep cardiac plexus situated between the aorta and the pulmonary artery.

37. Principal origin of the anterior coronary plexus.

38. A thickish nerve arising from the left side of the great deep cardiac plexus, and immediately forming upon its origin an oval-shaped ganglion, from which many twigs lying upon the ligamentum arteriosum proceed. These branches partly run to those which form the anterior coronary plexus, partly to those which form the posterior coronary plexus.

39. Nervous twigs, No. 38. proceeding to the anterior coronary plexus.

40. Fasciculus of nerves arising from the left side of the great deep cardiac plexus, and winding behind the ligamentum arteriosum H, and running upon the left branch of the pulmonary artery, constituting the principal seats of the great deep cardiac nerve of the left side.

41. Deep insertion of the superficial left cardiac nerve into the deep cardiac nerve of the left side, behind the ligamentum arteriosum H.

42. Intricate and complicate origin of the great deep cardiac nerve of the left side, No. 40, 41. already indicated.

FALLOPIUS appears to have accurately understood the origin of this nerve when he wrote, "Under the base of the heart, where the arterial vein (pulmonary artery) begins to be reflected to the left side, and where we observe that remarkable arterial passage in the fœtus which joins this vein with the

No.

aorta, there is a plexus or nervous anastomosis, similar to that which I have already described as existing in the mesentery, but smaller, stronger, and more solid, from which an abundant supply of nervous material is diffused over the whole base of the heart. Many branches of small nerves arising from this plexus are dispersed over the heart, and through its substance, although I could not minutely trace them. Anatomists judging hastily have neglected this ligament, and have thereby overlooked many nerves which are distributed to the heart".—*Observ. Anat.* page 208.

43. The trunk of the great deep cardiac nerve of the left side. This nerve is soft, pellucid, and gangliform, constantly preserving the same appearance throughout all its ramifications. This seems to be that single nerve which GALEN assigned to the heart, and which VESALIUS depicted, although he derived it from the eighth pair, and from a common root with the recurrent, an oversight hardly to be imagined.

44. Additional filaments, which the great deep cardiac nerve of the left side receives from the cardiac plexus, through the intermediate ganglion, No. 38.

45, 46, 47, 48. Division of the great deep cardiac nerve into branches near the posterior surface of tne pulmonary artery, which, uniting with the gelatinous branches of the cardiac ganglion, complete the posterior coronary plexus.

49, 50. Some small twigs of the great deep cardiac nerve of the left side creeping along the anterior surface of the pulmonary artery, and running into the anterior coronary plexus.

51, 52. Branches of the great deep cardiac nerve of the left side, which, after many windings, proceed behind the pulmonary artery to the posterior coronary plexus.

53. Some very minute twigs of the great deep cardiac nerve of the left side, running to the left lung along with the artery of the same name.

54. Posterior coronary plexus, or anastomosis between the soft pellucid branches of the deep cardiac of both sides, which ceasing at the commencement of the posterior coronary artery, and immediately dividing again and again, follows the course of the posterior coronary artery, by which means it is extensively distributed upon the anterior and posterior surface of the heart.

No.

"But most of the branches," HALLER says, "proceed to the left coronary artery, and "accompanying the anterior branch of this "artery, run to the superior surface of the "heart; others in great numbers direct their "course along with the posterior branch to "the hollow surface of the heart, and to the "left auricle, the rest of which they encircle." *Elem. Phys.* Lib. VI. Sect vi. § xxv.

55. Branches of the posterior coronary plexus, accompanying the anterior branch of the posterior coronary artery.

56. Twigs of the posterior coronary plexus, which, proceeding for a long way under the pulmonary artery towards the base of the heart, and crossing over the trunk of the posterior coronary artery, are joined to the anterior branch, *b*, of this artery.

57. Origin of that bundle of nerves, which is shown in Plate III.

58, 59. Nervous filaments, which accompany the arterial branch of the convex margin of the heart.

60, 61. Nerves of the posterior coronary plexus, following the course of the posterior branch of the left coronary artery, and proceeding to the plane surface of the heart.

62, 63. A very minute nervous twig accompanying the reflected branches of the posterior coronary artery towards the plane surface of the heart.

64, 65. Several very long nervous twigs running along with the branches of the posterior coronary artery.

66. Small nerve going to branch No. 65.

67. Two nervous twigs reflected on the anterior surface of the heart, where they are applied upon the anterior branch of the posterior coronary artery.

68. Nervous filaments of the posterior coronary plexus, following the course of the arteries of the auricle and of the posterior venous sinus.

69, 70. Small nervous threads, which, sent off from the great and deep cardiac plexus, behind the pulmonary artery, and above the sinus of the pulmonary veins, after a long course, descend to the plain surface of the heart, where they are united with the nervous filaments of the posterior coronary plexus.

From the origin and distribution of the nerves of the heart, already pointed out in this as well as in the last Plate, it is evident that there are two distinct dispositions of those nerves, viz. one accompanying the anterior coronary artery, the other the posterior coronary artery. Yet these two distributions of the nerves of the heart do not completely correspond to the cardiac nerves from which they are derived, as, that that which is anterior should entirely belong to the right cardiac, and that that which is posterior should correspond solely to the left. For the dissection of this double arrangement teaches us, that the cardiac nerves, in their progress around the large vessels at the base of the heart, anastomose by alternately giving and receiving branches; and, besides, that each plexus is composed and formed by the union of the cardiac nerves of both sides. For the right deep cardiac nerve lying under the arch of the aorta, after giving filaments to form the anterior coronary plexus, the remainder, and that by far the greater part of it, creeps under the pulmonary artery to the posterior surface of the heart, that it may contribute to form part of the posterior coronary plexus at the commencement of the posterior coronary artery. Then, the left great deep cardiac nerve, freed from the posterior coronary plexus, bestows not a few of its filaments, and those pretty large, to increase the anterior coronary plexus. But in even slightly comparing the force of the nerves of either coronary plexus, it is abundantly evident that that distribution of this arrangement of nerves which is carried to the posterior surface of the heart, far surpasses in quantity and thickness that which is distributed upon the anterior surface of the heart: In fine, that each disposition of those nerves follows the unequal proportion of the fleshy mass composing the ventricles of the heart.

71. Eighth pair of the left side.

72. Superficial cardiac branch of the eighth pair of the left side.

73. Anastomosis between the superficial cardiac nerve of the eight pair and the small deep cardiac nerves of the great sympathetic.

74. The first cardiac branch of the eighth pair along with the small deep cardiac nerve of the sympathetic, inserted into the great cardiac plexus.

75. Twigs of the same reflected behind the pulmonary artery to the great cardiac plexus, and accompanying the arteries of the sinus venosus and each ventricle.

76. Recurrent nerve of the left side.

77. Two branches of the recurrent, which, proceeding downwards, are immediately re-

No.

flected upwards and run towards the great cardiac plexus.

78, 79. Distribution of the recurrent along the left side of the trachea and thyroid gland.

80. Nervous filament formed by twigs from the eighth and recurrent, which dividing directly into several small branches, follows the division of the pulmonary artery and of the bronchia of the same side.

81. A nerve from the eighth, which, very constant in its situation, runs behind the pulmonary artery of the left side to the filaments accompanying the arteries of the sinus venosus and each ventricle.

82, 83. Very small nervous twigs of the same order distributed to the anterior surface of the left lung.

No.

84. Branches of the eighth pair, proceeding more particularly to the left lung, and especially to the divisions of the bronchia.

85. A branch of the nerve No. 80. appearing between the two principal trunks of the pulmonary veins of the left side, and running to the anterior surface of the lung.

86. Trunk of the eighth pair winding behind the left bronchia to the oesophagus.

87, 88. Brachial plexus.

89. Left phrenic nerve.

90. Right phrenic nerve.

91, 92. Very small nervous twigs accompanying the transverse artery of the neck and the internal mammary artery.

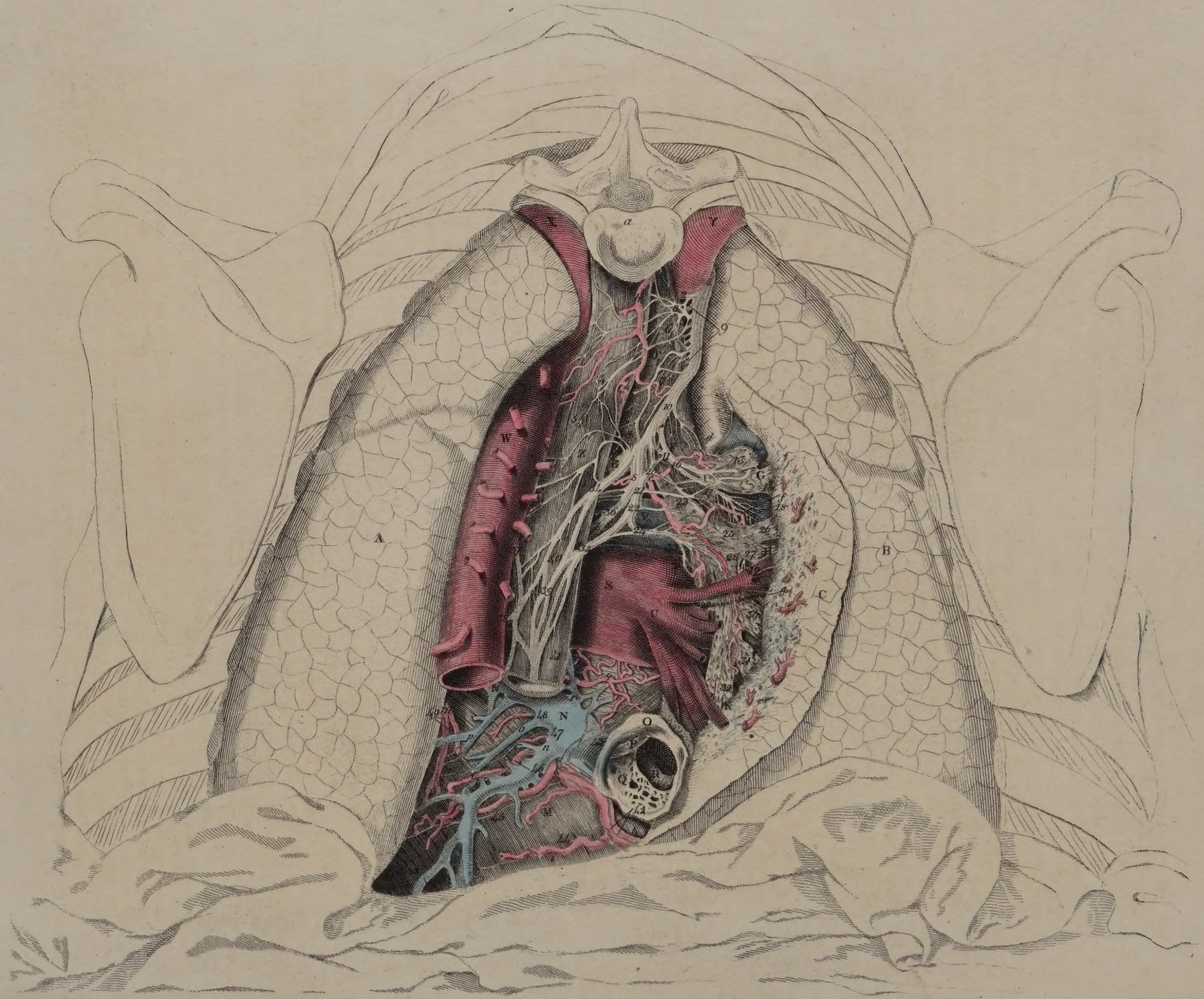

a
A
B
C
N
O

PLATE V.

The Posterior Pulmonary Plexus of the Pneumo-gastric Nerve. The Nerves of the Plain Surface of the Heart.

A—The posterior convex surface of the left lung. The thorax is laid open from behind by the removal of the dorsal part of the vertebral column.

B—The posterior convex surface of the right lung.

C—The substance of the right lung dissected and thrown aside, in order to expose the first divisions of the bronchi and the principal branches of the posterior pulmonary plexus in their mutual relations.

D—Posterior aspect of the trachea beset with many mucous follicles and glands.

E—The left bronchus.

F—The right bronchus.

G, H, I, K, L—The division of the right bronchus into branches.

M—The plain surface of the heart.

N, N—Trunk of the coronary vein.

O—The inferior vena cava cut.

P—The vestige of the foramen ovale covered with a membrane.

Q—The Eustachian valve.

We have taken this opportunity, in order that, by laying open the inferior vena cava from behind, we might show plainly the true seat of this valve to those not conversant with anatomical details. From this disposition of the parts, we think that even those the least practised in dissection will understand that the Eustachian valve completes the inner wall of the *right* auricle, and also that this valve constitutes the limit between the root of the *right* auricle and the inferior vena cava; for which reason this valve hinders very little, as was once thought, the blood of the superior vena cava from pressing on that of the inferior, but rather prevents the blood, when once received into the sinus of the right auricle, from passing easily into the inferior vena cava at the time of the contraction of the right auricle; at least that the blood of the *right* auricle may not at that time force that of the inferior cava too much outwards. Vide HALLER, *Elem. Phys.* Lib. IV. Sect. ii. § xiii. The same valve may also in the foetus turn the blood of the inferior cava from the right auricle towards the foramen ovale. TREW, p. 76.

This valve is generally broader whenever its superior free margin is reticulated; when, however, this reticulated structure is wanting, it is narrower.*

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* I here subjoin HALLER's Description of the Eustachian Valve, as it agrees exactly with our Plate.

"The Eustachian valve of the vena cava," says he, "is a similunar membranous appendix, projecting from the left side of the right sinus, where the auricle is continuous with the vena cava inferior. I mean by sinus all that expansion bounded on the right and posteriorly by the continuous membrane of the auricle, and opening by a wide orifice to the left and anteriorly into the auricle, posteriorly into the ventricle; from it the inferior vena cava is continuous upwards. In this sinus the valve originates between the vestige of the *foramen ovale* and mouth of the great coronary vein, a little lower down than the middle of the vestige of the foramen ovale, but more to the right and higher up than the coronary vein, near the posterior termination of the right auricle, into the left column of the isthmus of Vieussens. It then ascends by the margin which limits the auricle, where it adheres by a semicircular connexion to the sinus, first to the left, then upwards, and finally to the right side, gradually thinning away from the place

R—Columnae carneae at the entrance of the right ventricle of the heart.

S—Sinus of the pulmonary veins.

T, U—The two principal trunks of the pulmonary veins of the right side.

V—Pulmonary artery.

W—Thoracic aorta.

X—Left subclavian artery.

Y—Arteria innominata.

Z—Oesophagus.

a—First dorsal vertebra.

b.—The *superior* œsophageal artery.

c.—The right bronchial artery.

This artery pretty frequently arises by a common trunk along with the superior aortic intercostal artery. In this way HALLER has distinctly drawn it,—*vid.* Fasc. III. Fig. 1. Not unfrequently, however, this right bronchial artery comes off from the aorta by a single trunk, and runs to the right bronchus.

d, *e*, *f*, *g*.—Branches of the right bronchial artery, ramified near to, and upon the bronchia of the same side.

h.—Right coronary artery, where it is turning round to the plain surface of the heart.

i, *k*, *l*.—The principal branches of the *right* coronary artery distributed on the plain surface of the heart.

m.—A branch of the left coronary artery gliding to the plain surface of the heart.

n.—The *middle* vein of the heart. HALLER, *De Vasis Cordis Propriis.*

o, *p*.—Branches of the coronary vein running towards their common trunk N.

q.—A small artery of the left sinus venosus of the heart.

r.—Small veins creeping round the sinus of the pulmonary veins.

s.—A branch of the bronchial artery under the first division of the trachea, distributed to the bronchial glands.

1. The Pneumo-gastric nerve of the right side.
2. Right recurrent nerve.
3. Branches of nerves from the recurrent and Pneumo-gastric, some of which, going up towards the trachea, are called *ascending*, others running downwards are called *descending*.
4. The *smaller posterior* œsophageal plexus of the Pneumo-gastric.
5. Filaments of the Pneumo-gastric particularly devoted to the œsophagus.
6, 7, 8. Nervous filaments of the Pneumo-gastric, partly distributed to the fleshy glandular substance of the trachea, partly winding round the œsophagus.
9. Branches from the Recurrent and Pneumo-gastric, forming the anterior pulmonary plexus. Tab. III. No. 31, 32, 33.
10. A fasciculus of nerves from the Pneumo-gastric, distributed to the commencement of the right bronchus.
11. A remarkable nervous branch of the *posterior* pulmonary plexus of the Pneumo-gastric accompanying the right bronchus.
12, 13, 14, 15, 16. The intricate distribution of this nervous branch to the first division of the bronchus.
17, 18, 19. A very strong branch of the same nervous cord following the second and third divisions of the bronchus, running above and behind the pulmonary air-tubes, and now and then inserted into them.
20, 21, 22. Other smaller nerves of the *posterior* pulmonary plexus of the Pneumo-gastric, running to the trunk of the right bronchus.
23. The mutual union of the same, and the distribution of each into the pulmonary air-tubes.
24. Another remarkable nervous cord of the *posterior* pulmonary plexus of the Pneumo-gastric, following the branches of the right bronchus.
25, 26, 27. Twigs of the same nervous cord No. 24. going to the second division of the right bronchus, and distributed to it.
28, 29, 30, 31, 32. The division of the nervous cord No. 24. into still smaller branches, cor-

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of its posterior origin, until it terminates in the anterior situation of the limit of this auricle, coursing along its base. Its figure is in general semilunar, its greater circumference nearly equal to a semicircle, the interior and free edge to a segment of a smaller circle. It is broadest in the middle, perceptibly diminishing toward the large circumference. In the natural state, this membrane is double; looking in towards the sinus, it is tense and powerful, but, near its posterior termination particularly, it is completely reticulated, having its fibres either intricately arranged in open spaces, or expanded and interwoven over a very thin membrane, so that a reticulated layer remains when this thin membrane has been removed by dissection. It so rarely presents this reticulated appearance, that it would appear to be in most instances praeternatural. Taken altogether, it is horizontal, slightly concave towards the auricle, and convex towards the vena cava inferior. It is always present in the foetus, and I have never in any example seen it entirely wanting in the adult.—*Opera. Min. Nuperae Observ. de Valvula Eustachii*, § iv.

responding exactly to the divisions of the right bronchus seen in that region of the lung.

33. Another very remarkable branch of the nerve No. 24, going behind the bronchus L. Moreover, the same cord, being separated into smaller and smaller branches, frequently penetrates in its course the pulmonary air tubes in the same manner as the nerve No. 28, and having become very small, is distributed to the bronchi themselves.

All these nerves taken together, and following the divisions of the bronchi, form what is called the posterior pulmonary plexus of the Pneumo-gastric; concerning which, *vid.* HALLER, *Elem. Phys.* Lib. viii. Sect. ii. § xxv. WALTERI, Tab. iii. No. 406, 407.

GALEN had taught, "that the lung received from the sixth union of the cerebral nerves only two very small ones, which are distributed to the outside of the pleura, and do not extend to the substance of the lung; therefore," adds he, "no pain troubles those who throw up blood from the lungs."—*De Loc. Affect.* Lib. iv. cap. 5. VESALIUS asserted the same thing, when he mentioned the little complaint made by those whose lungs are in a state of suppuration.—*Exam. Observ. Falloppii*, pag. 109. VESALIUS freely used this argument, that he might also on this occasion find fault with FALLOPPIUS, who, contrary to the opinion of all anatomists of his time, had long taught, that the lung received *more than two small nerves*. "For these very nerves, of the sixth pair of each side, (Pneumo-gastric,) says FALLOPPIUS, when they pass by the roots of the lungs, give off many filaments, not to the pleura only, but to the branches of the trachea, along with which they are distributed to the whole lung."—*Obs. Anat.* pag. 154. Hence FALLOPPIUS truly pointed out and described the nerves of the lungs more wisely and carefully than preceding and even later anatomists. For he clearly showed, that there were not few, but many of these nerves which go to the lungs; and what is remarkable, that these filaments do not indiscriminately follow any kind of pulmonary vessels, but being first connected with the Branches of the Bronchi, chiefly accompany the air-tubes.

Nevertheless, almost all clinical observers continue to assert, along with GALEN and VESALIUS, that the lung has not much feeling; nor are there wanting amongst the practitioners of our day some, who, by ascribing the seat of pleuritis to the pleura, and not to the lungs, altogether deny sensation to them. In this they are chiefly supported by the authority of HALLER, who says, that in living *animals the lung can be cut without any agitation of the animal*,—loc. cit. On which subject, whilst physicians shew great anxiety in endeavouring to establish their own opinions, they seem to us unfairly to conceal the fact, or to dissemble, that the lung is not always insensible, neither does it shew itself to be so in all the affections to which it is liable, and which differ so much from each other, as well in their situation as disposition; nay, they are forced to confess that the lung is affected with vehement and acute pain in Peripneumonia vera, in recent ulcers affecting the air passages, in Phthisis calculosa, and the like.

Since, then, Anatomy shews that the lungs receive an abundant supply of large nerves from the *anterior* and *posterior* pulmonary plexus of the Pneumo-gastric, we think this sufficient to forbid us to deny to this viscus altogether the faculty of sensation. But since we cannot deny, that the lungs do not at all sometimes shew sensibility proportionate to the apparatus of nerves, a question now arises, not unworthy the attention of physiologists, viz. why the lung, although sufficiently well supplied with nerves, should sometimes experience pain in a moderate degree, or not at all, and sometimes exquisitely severe.

I think that Dissection clearly shows the cause and reason of these phenomena. Indeed, the nerves of the lungs, strictly speaking, were not altogether created for the cellular and vascular texture of these organs, but chiefly for the bronchi and air tubes; for those nerves are but small which are distributed to the very outer surface of this viscus, or which accompany the blood-vessels more deeply; then the greatest part of the *pulmonary plexus* embraces the divisions of the bronchia, and united to these by numerous twigs, penetrates by particular orifices the larger and the smallest air tubes whereever they are extensively distributed through the lung: it altogether sup-

plies to these air tubes, to their fleshy fibres and internal membrane, a great number of nervous twigs, on account of which they possess that exquisite feeling known to every one. Wherefore, if the principal seat of the sensation which the lung enjoys reside in the bronchi and air passages, it is easy to determine why, in diseases affecting the surface of the lungs, and also in those which occupy the *interlobular* cellular tissue, only an obtuse, or, as physicians call it, an *oppressive sensation*, arises, and then why an acute pain, with a severe cough, troubles those in whom inflamed and suppurating bronchial tubes are injured by calculous concretions or any other sort of irritation.

Indeed, Peripneumony by *transudation of blood*, (Haller, *Opusc. Patholog. Observ.* XVI. XVII.) in which such an effusion of blood sometimes takes place into the interlobular cellular tissue, that a great part of the lung at length becomes quite black, deceives by a mild beginning, nor does any acute pain precede the suffocation and ultimate destruction of the patient. In like manner, in dropsy of the substance of the lung, that is, an effusion of water into the interlobular cellular tissue of this viscus, except the sensation of weight and difficult respiration, no acute pain disturbs the patient. Tubercles, vomicæ, and other affections of the cellular tissue, except those implicating the bronchi and air passages of the lobules, take their origin without being noticed, and sometimes go on for a long time without pain.

Sometimes, in genuine Peripneumony, when the inflammation chiefly rages in the bronchi and air passages, (for which reason this disease ought rather to be called *Bronchitis* than Peripneumony,) Vid. *Franck de Curand. Hom. Morb.* Vol. II. § 173, pain in the lung foretels the invasion of the disease, which, by the increase of the malady, becomes most acute, pungent, with remarkable constriction at the sternum, panting, cough, and frothy, viscid, and bloody spitting; which symptoms, moreover, very much resembling those which accompany *Cynanche Laryngea*, indicate, in true Peripneumony, that the divisions of the trachea, not less endowed with acute sensation than the trachea itself, labour under inflammation.

But both the increased sensibility of the lung, and the pain, as soon as pus makes way for itself within the air tubes, indicate the presence of a vomica, which has lurked a sufficiently long time in the interlobular cellular tissue of the lungs. For as much as a titillation then first commences in the thorax, which is followed by pain with a sense of constriction at the sternum, troublesome cough, bloody, purulent, and fœtid spitting, and afterwards by an abscess having a free communication with the bronchi.

In the last place, we think that the phenomena of convulsive Asthma must be looked for from no other cause than this close connexion of the nerves of each pulmonary plexus with the bronchi. Indeed, under a paroxysm of this obstinate disease, it is clearly perceived, whilst you would almost say the cellular and vascular texture of the lungs were free of it, that the divisions of the bronchi alone suffer the force of the disturbed action of the nerves of the lungs, to which the spasmodic contractions of the fleshy fibres, which are dispersed between the cartilaginous pieces of the bronchi, exactly correspond, then the crowding and rigidity of those air tubes as they are widely distributed through the lungs, whence follow that short breathing and whistling respiration, with fruitless attempts at coughing, and sense of weight around the praecordia, and other similar symptoms which accompany spasmodic affections of the air passages of the lungs. But these phenomena are sometimes produced, as the practice of medicine shows, from a collection of crude phlegm lurking in the stomach and interrupting its actions; because the same order of nerves which supply the stomach likewise governs the life, sensibility, and action of the fleshy fibres which are interspersed in the bronchi. And, since there is not the smallest doubt that the nerves of the stomach sympathise with the whole system of nerves, wherever there is cause for such a phenomenon, much less ought we to doubt that the branches of the Pneumo-gastric distributed to the stomach maintain a sympathy with the remarkable pulmonary plexus of that nerve extensively disseminated through the bronchia.

34, 35, 36. The Pneumo-gastric nerve of the right side, where its division begins to surround the oesophagus in several ways behind the bronchus.

37, 38, 39. Great oesophageal plexus of the Pneumo-gastric, joined together by twigs from the nerve of each side.

40, 41. Certain nervous filaments distributed to the substance of the oesophagus itself. Walter, Tab. III. No. 442, 444, 454.

42. Two filaments of the Cardiac nerves, which accompany the right coronary artery, runing to the plain surface of the heart.

43. Anastomosis of the same nerves, with some very slender twigs from the great Cardiac plexus, descending between the inferior vena cava and the sinus of the pulmonary veins.

44, 45, 46, 47, 48. Those small nerves accompanying the branches of the right coronary artery, which are distributed to the plain surface of the heart.

49. Small nerves from the number of those which follow the branches of the left pulmonary artery, which turn to the plain surface of the heart. Vid. Tab. IV. No. 63. *h*.

These are, therefore, the nerves, generally branches of those which look to the plain surface of the heart, which, being given off from each coronary plexus, follow the flexuous arteries of the same name to the plain surface of the heart; where, as soon as they have arrived, although they join the trunk of the coronary vein, and the numerous branches running to it, none, however, accompany these tubes, but, having passed them, they hasten to the arterial branches, whose direction they follow for a short way, but how far they lurk together in the flesh of the heart has not been shown any other where than from its convex surface. The nervous filaments are generally more slender in this part of the heart than on its convex surface, although it has frequently happened, among the many examinations instituted by us, that we also found this part very conspicuous for the size of the nerves, especially in those subjects in whom the heart was remarkable for its size and fleshiness. All which things, moreover, will appear more clear by the inspection of the following Plate.

PL.VI.

Fig. 1.

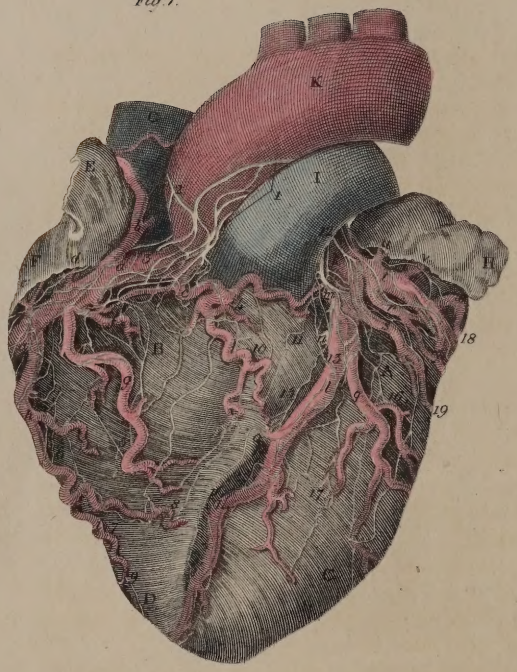
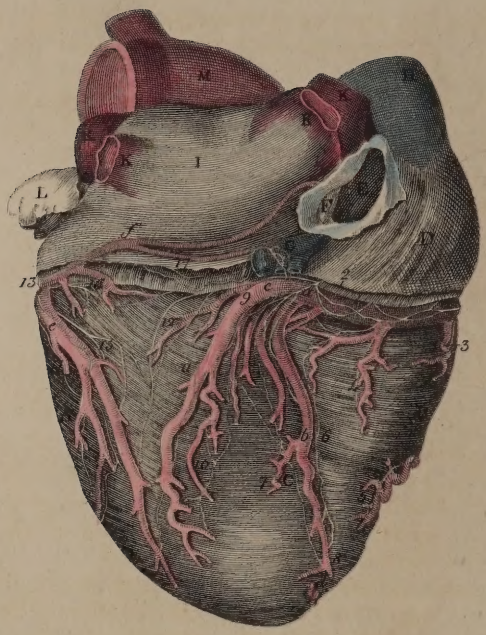


Fig. 2.



E. Mitchell fecit

PLATE VI.

Another Specimen of the Nerves of the Heart.

Figure I.

Superior Convex Aspect of the Heart.

A—The superior convex aspect of the heart projecting posteriorly, which contains the left ventricle.

B—Slanting surface of the heart, which stretches downwards and conceals the right ventricle.

C—The obtuse margin of the heart.

D—The acute margin of the heart.

E—Right auricle of the heart.

F—Right *sinus venosus* of the heart.

G—Superior vena cava.

H—Left auricle.

I—Pulmonary artery.

K—Aorta.

a, a.—Trunk of the *right* coronary artery, which is at the same time inferior and anterior to its fellow of the left side.

b.—A branch of the *right* coronary artery, which goes to the right auricle of the heart and the superior vena cava, inosculating at the same place with a small branch of the left coronary artery.

c.—A branch of the *right* coronary artery stretching round the root of the pulmonary artery, and which, being generally joined with the first branch of the *left* coronary artery, forms a net-work, from which the pulmonary artery and the adjoining substance of the heart receives twigs.

d, e.—Smaller branches going to the right *sinus venosus* of the heart.

f, g, h, i.—*Nameless* branches of the *right* coronary artery creeping over the convexity of the right ventricle of the heart.

k.—The *left* coronary artery, superior, and posterior to the *right*, and generally larger.

l.—A *larger* branch of the *left* coronary artery, which descends along the obtuse margin of the heart, and the seat of the septum cordis, chiefly anterior as far as the apex.

m, n, o, p.—Deep twigs of the larger branch of the *left* coronary artery to the septum cordis hid in that depression.

q.—A remarkable branch of the *larger* branch of the *left* coronary artery, distributed to the convexity of the left sinus of the heart.

r, s.—Two branches almost parallel going off from the principal trunk of the *left* coronary artery, and stretching down over the uneven surface of the obtuse margin of the left ventricle of the heart.

t.—A *smaller* branch of the *left* coronary artery, which being reflected along the depression between the left ventricle of the heart and the auricle of the same side, first backwards and upwards, and then forward, namely, along the obtuse margin, runs toward the plain aspect of the heart.

u, v, x, y.—Twigs of the *smaller* branch of the *left* coronary artery sent to the left auricle of the heart.

1. The right coronary plexus of nerves which are proper to the heart. Vid. Tab. III. No. 124. Tab. IV. No. 37.
2. A nervous zone embracing the root of the aorta, and running into the right coronary plexus. Tab. III. No. 119.
3. Filaments of the right coronary plexus accompanying the trunk of the *right* coronary artery. Moreover, some nerves of this order, neither deficient in number nor size, and covered by the trunk of the right coronary artery, go and penetrate along with small arteries the summit of the right ventricle of the heart.

4, 5, 6, 7, 8, 9, 10. Nervous twigs of the right coronary plexus, which, along with *nameless* arteries, penetrate the substance of the right ventricle.

11. A filament from the left Cardiac plexus stretched to the right side of the heart.

12. Left or *posterior* coronary plexus. Tab. IV. No. 54.

13, 14. Filaments of the left coronary plexus accompanying the *larger* branch of the *left* coronary artery.

15. A pretty strong branch in the depression of the *septum ventriculorum*, penetrating along with an artery the septum itself.

16, 17. Remarkable branches of the left coronary plexus accompanied by arteries which go along the convex margin of the left ventricle of the heart.

18, 19. Filaments of the left coronary plexus reflected along with a *smaller* branch of the *left* coronary artery to the plain surface of the left ventricle.

Figure II.

The Plain Surface of the Heart.

A—Obtuse margin of the heart.

B—Acute margin of the heart.

C—A linear depression which marks the seat and direction of the septum cordis.

D—Right sinus venosus.

E—The mouth of the inferior vena cava.

F—The vestige of the *foramen ovale* which existed in the foetus.

G—Part of the cut trunk of the coronary vein.

H—Vena cava superior.

I—Sinus of the pulmonary veins.

K, K, K, K.—The principal trunks of the pulmonary veins.

L—Left auricle of the heart.

M—Aorta.

a, *a*,—The *right* coronary artery reflected to the compressed surface of the heart around its acute margin, and between it and the root of the right *sinus venosus*.

b,—A branch of the *right* coronary artery companion of the *vena media*.

c,—A remarkable branch of the *right* coronary artery, which, stretching far backwards, reaches nearly as far as the obtuse margin of the heart. Indeed, this very free division of the right coronary artery into branches over the plain side of the heart is not constant, as Haller has remarked, in treating of the *proper vessels of the heart*, (*de vasis cordis propriis*,) but the general distribution is shown in Tab. V. *k*. *l*.

d,—The apex of the *larger* branch of the *left* coronary artery, which sometimes meets the flexure of the vena *media* beyond the point of the heart.

e,—The *smaller* branch of the *left* coronary artery proceeding round the obtuse margin of the heart to the plain surface of the left ventricle. Fig. I. *t*.

f,—An artery of the sinus of the pulmonary veins coming from the *smaller* branch of the *left* coronary artery; concerning which, vid. Halleri *Icon Anat. Fasc.* viii. (1.)

1, 2. Nervous filaments of the right coronary plexus which, along with the *right* coronary artery, run round the acute margin of the heart to the plain surface of this viscus.

3, 4, 5, 6, 7, 8. Nervous twigs of the right Cardiac plexus, which, along with arteries, are distributed to the plain surface of the right ventricle of the heart.

9, 10, 11, 12. Nervous filaments of the right Cardiac plexus, accompanying branches of the *right* coronary artery, which are distributed to the plain surface of the left ventricle of the heart.

13, 14, 15, 16. Nervous twigs of the left coronary plexus, Fig. I. 18, 19, running along with a *smaller* branch of the *left* coronary artery to the plain region of the left ventricle of the heart, and penetrating along with smaller arteries the substance of the ventricle itself.

17. Two very slender nervous filaments given off above the heart from the *great Cardiac plexus*, which, after running a long course above the sinus of the pulmonary veins, at length enter near the insertion of the trunk of the coronary vein into an anastomosis with nervous filaments accompanying the *right* coronary artery.

PL.VII.

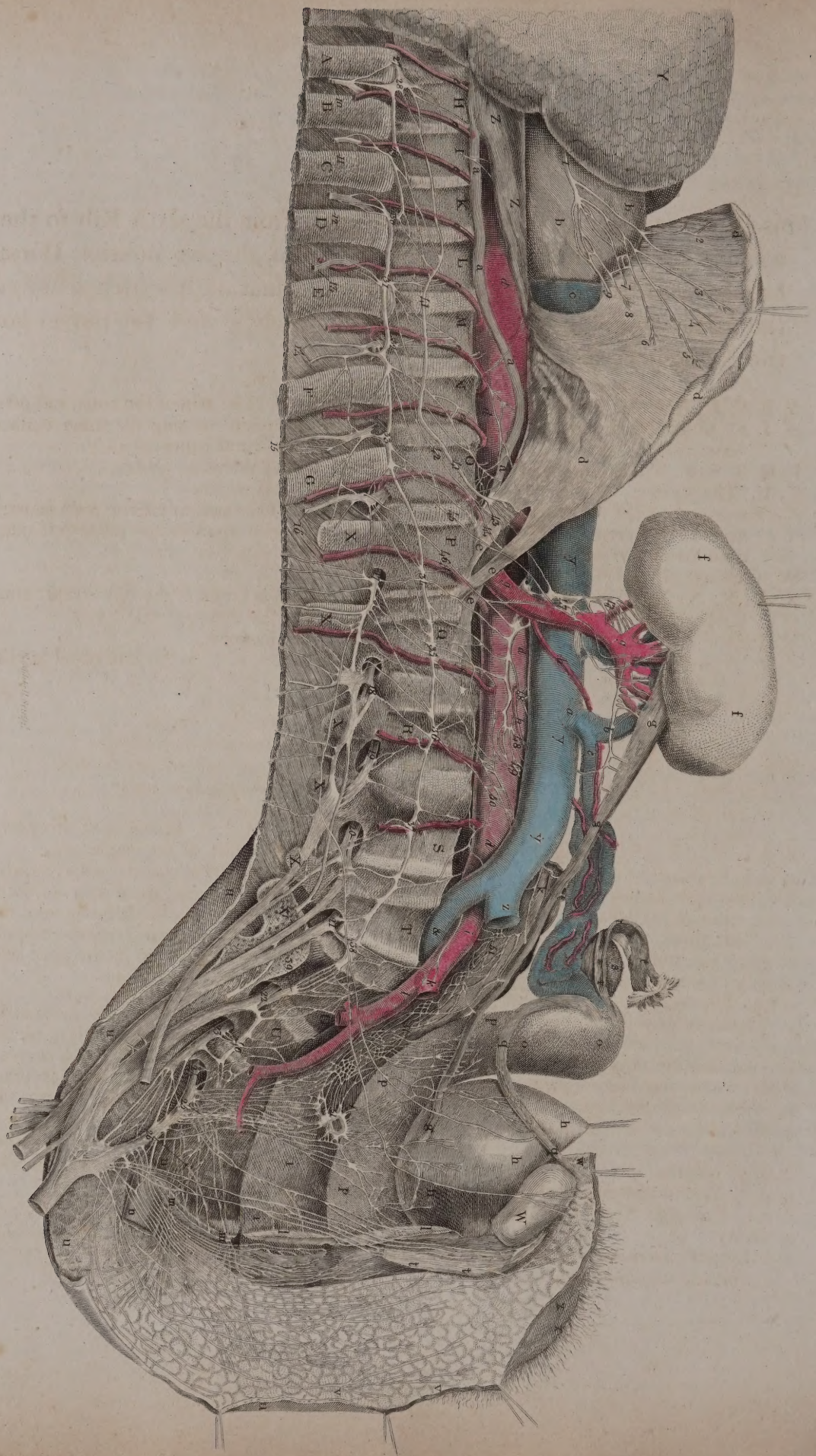


PLATE VII.

This Plate represents the Sympathetic Nerve, from the sixth Rib to the third bone of the Sacrum, of the right side; also, the six inferior Dorsal, the Lumbar and Sacral Nerves. The Os Innominatum has been removed, that the parts situate in the interior of the Pelvis, and the nerves going to them, might be better seen.

A. B. C. D. E. F. G. The seven lower ribs.
H. I. K. L. M. N. O. The seven lower dorsal vertebræ.
P. Q. R. S. T. The lumbar vertebræ.
U, U. The sacrum.
V. The lateral part of the sacrum, cut with a saw near the foramina, where the first and second sacral nerves pass out.
W. Cartilage of the left os pubis.
X, X, X, X, X. Transverse processes of the lumbar vertebræ.
Y. Inferior lobe of the right lung.
Z, Z. A portion of the pleura which formed the posterior mediastinum.
a, a, a, a. The thoracic duct drawn a little from its natural situation between the vena azygos and aorta.
b, b. The pericardium enclosing the heart.
c. The vena cava inferior entering the thorax by the opening in the cordiform tendon of the diaphragm.
d, d, d. The diaphragm separated from the ribs.
e, e, e. Crura of the diaphragm.
f, f. The right kidney removed from its natural situation, being drawn upwards and to the left side.
g, g, g. The ureter.
h, h, h. The urinary bladder.
i, i, i. The rectum.
k. Termination of the sigmoid flexure of the colon.
l, l. Levator ani muscle.
m, m. Ischio-coccygeus muscle.
n, n. Sacro-ischiatic ligament.
o, o. The uterus drawn upwards and to the left side.
p, p, p. Vagina.
q, q, q. Round ligament of the uterus.
r, r, r. Fallopian tube.
s. Ovary.
t, t. Corpus cavernosum clitoridis with its erector muscle adhering to it.
u, u, u, u. The skin of the nates and perineum.
v, v. The skin covering the inner surface of the thigh and pudendum.
w. Skin of the mons veneris.
x, x. Labia majora.
y, y, y. The vena cava drawn from its natural situation upwards and to the left side.
z. Right iliac vein, cut.
&. Left iliac vein.
a. Common trunk of the right renal vein, *b*, and of the right spermatic vein, *c*.
d, *d*, *d*, *d*. Aorta.
e, *e*, *e*, *e*, *e*, *e*, *e*. Aortic intercostal arteries.*
f, *f*, *f*, *f*. Lumbar arteries.
g, *g*. Renal artery.
h, *h*. Spermatic arteries.
i. Right common iliac artery.
k. Right external iliac artery, cut.
l. Right internal iliac artery.
1. Phrenic nerve.
2. 3. 4. 5. 6. 7. 8. Branches of this nerve to the convex surface of the diaphragm.
9. A branch of the phrenic nerve, which anastomoses with one or more twigs of the sub-diaphragmatic plexus which comes from the solar: this anastomosing branch passes through a small hole in the diaphragm on the right side of the opening for the vena cava.
The rest of this nerve is seen in plate viii. 7, 7.
10. 11. 12. 13. 14. 15. 16. The anterior branches of the sixth, seventh, eighth, ninth, tenth, eleventh and twelfth dorsal nerves.
17. 18. 19. 20. 21. The anterior branches of the first, second, third, fourth, and fifth lumbar nerves.
22. 23. 24. 25. 26. The anterior branches of the first, second, third, fourth and fifth sacral nerves.

* The artery which runs along the lower margin of the twelfth rib, although not an intercostal artery, strictly speaking, is however generally called the last intercostal.

27. The sympathetic nerve cut between the fifth and sixth dorsal ganglions.

28. 29. 30. 31. 32. 33. The sixth, seventh, eighth, ninth, tenth, and eleventh thoracic ganglions of the sympathetic nerve. They communicate each, by one or more twigs, with the dorsal or intercostal nerves.

34. 35. 36. 37. 38. The first, second, third, fourth, and fifth lumbar ganglions of the sympathetic nerve. They receive branches of communication from the lumbar nerves, in the same way as the thoracic ganglions communicate with the dorsal nerves, but their branches of communication are longer, because the sympathetic nerve in the loins is situated more on the fore part of the vertebræ, and consequently farther removed from the lumbar intervertebral foramina.

39. 40. Sacral part of the sympathetic nerve.

For a more complete view of this part of the sympathetic nerve vide plate xi. of this series.

41, 41. The trunk of the greater splanchnic nerve, formed by the union of branches proceeding from the sixth, seventh, and eighth thoracic ganglions of the sympathetic. It proceeds obliquely downwards on the fore and lateral part of the vertebral column; and, having arrived at the diaphragm, it divides into four branches, which perforate its crura to get into the abdomen.—*Vide* plate viii. 4.

42. Trunk of the smaller splanchnic nerve, proceeding into the abdomen, between the crura of the diaphragm, where it immediately divides into two branches—a superior and inferior.

43. The superior branch joining the greater splanchnic.

44. The inferior branch; this not only joins the semilunar ganglion of the sympathetic, but also the renal plexus.

45. The posterior and superior renal nerve, formed by the union of branches from the tenth and eleventh ganglions of the sympathetic nerve.

46. Posterior and inferior renal nerve. This anastomoses with the former.

47, 47. Renal plexus.

48, 48. Spermatic plexus.

49. Inferior mesenteric plexus.

50. Aortic plexus.

51, 51, 51. The hypogastric plexuses sending branches to the rectum, uterus, vagina, urinary bladder, &c.

PL. VIII.

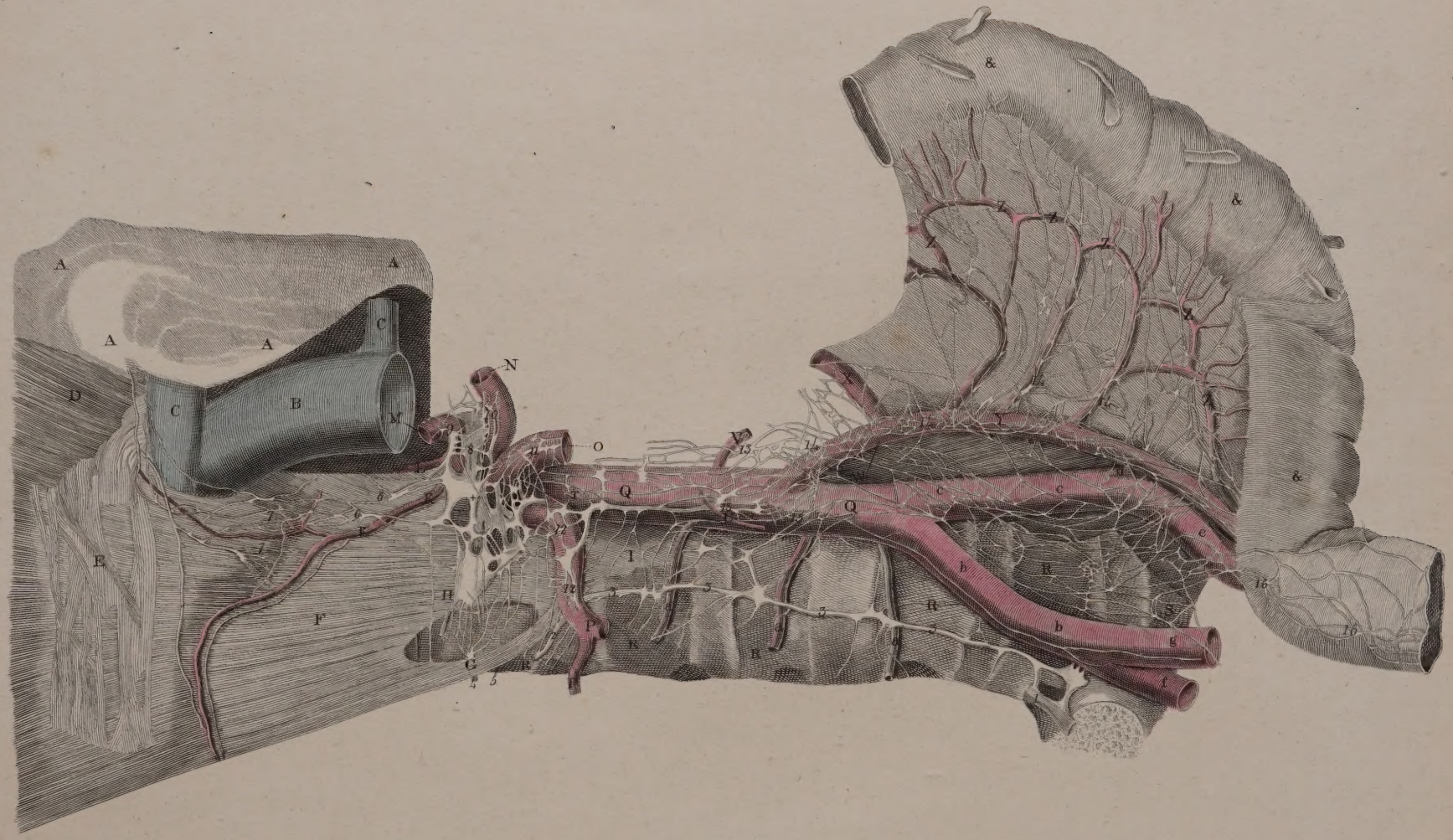


PLATE VIII.

This explains the origin and disposition of the Semi-lunar Ganglion, or rather of the Cœliac Ganglions of the right Side; it shows the Renal and Spermatic Ganglions of the right Side and their anastomosis with the Ganglions of the left Side, the Origin of the Superior Mesenteric Plexus, also the Inferior Mesenteric Plexus, and the right Hypogastric Nerves.

A, A, A, A. The lower surface of the right lobe of the liver thrown aside.
B. Vena cava inferior.
C, C. Branches from the liver to the vena cava.
D, E, F, G, H, I. The Diaphragm.
K, K. Right phrenic artery.
L. Common trunk of the coronaria ventriculi and left hepatic artery.
M. Right hepatic artery.
N. Splenic artery.
O. Superior mesenteric artery.
P, P. Right renal artery, cut.
Q, Q. Aorta.
R, R, R, R, R. The five Lumbar Vertebrae.
S. First bone of the sacrum.
T. Superior right spermatic artery.
U. Inferior right spermatic artery.
V. Left spermatic artery.
W. Trunk of the inferior mesenteric artery.
X. Ascending branch of the inferior mesenteric artery.
Y. Descending branch of the inferior mesenteric artery.
Z, Z, Z, Z, Z, Z. Twigs from the descending branch of the inferior mesenteric artery going to
&, &, &. The sigmoid flexure of the colon.
a, a, a. Lumbar arteries.
b, b. The right iliac artery.
c, c. Left iliac artery.
d. Left internal iliac artery.
e. Left external iliac artery.
f. Right internal iliac artery.
g. Right external iliac artery.
1. The anterior branch of the fifth lumbar nerve.
2. Trunk of the sympathetic nerve, or communicating branch between the last thoracic and first lumbar ganglion.
3, 3, 3, 3. Continuation of the sympathetic nerve along the side of the lumbar vertebræ; it consists of ganglions joined together by communicating branches. The lumbar ganglions are generally five in number, sometimes only two or three exist; they communicate with the anterior branches of the lumbar nerves, and they send off *internal* branches which form the aortic plexus.
4. Trunk of the great splanchnic nerve, which, after dividing into four branches, terminates in the semilunar ganglion.
5. The trunk of the smaller splanchnic nerve. This is formed of two branches, which come from the tenth and eleventh thoracic ganglions; when it has passed through the diaphragm into the abdomen it divides into two branches, a superior and an inferior, the former anastomoses with the great splanchnic nerve, the latter joins the semilunar ganglion and the renal plexus.

From these two nerves on each side, there arise the *semilunar ganglions* which are surrounded with a collection of other ganglions varying in number and size, but all connected together, so as to form a vast network, which is called the *solar plexus.*** This plexus, which receives some filaments from the pneumo-gastric, surrounds that part of the aorta where the cœliac artery arises; the ganglions which compose it are therefore called by Walther the author of this plate, the *cœliac ganglions.*

Productions of this plexus accompany the different arteries from the aorta: thus
6, 6. The sub-diaphragmatic plexus, which accompanies the phrenic arteries and anastomses, with
7, 7. The phrenic nerve.
8. The cœliac plexus surrounds the cœliac artery, and gives off
9. The hepatic plexus which accompanies the hepatic artery.
10. The splenic plexus which surrounds the splenic artery.
11. The superior mesenteric plexus which surrounds the superior mesenteric artery.
12, 12. Renal plexus around the renal artery.
13, 13. Spermatic plexus, on the spermatic artery.
14, 14, 14, 14. Inferior mesenteric plexus and its subdivisions.
15. The aortic plexus, (3, 3, 3.)
16, 16. Part of the hypogastric plexus.

PL. IX.

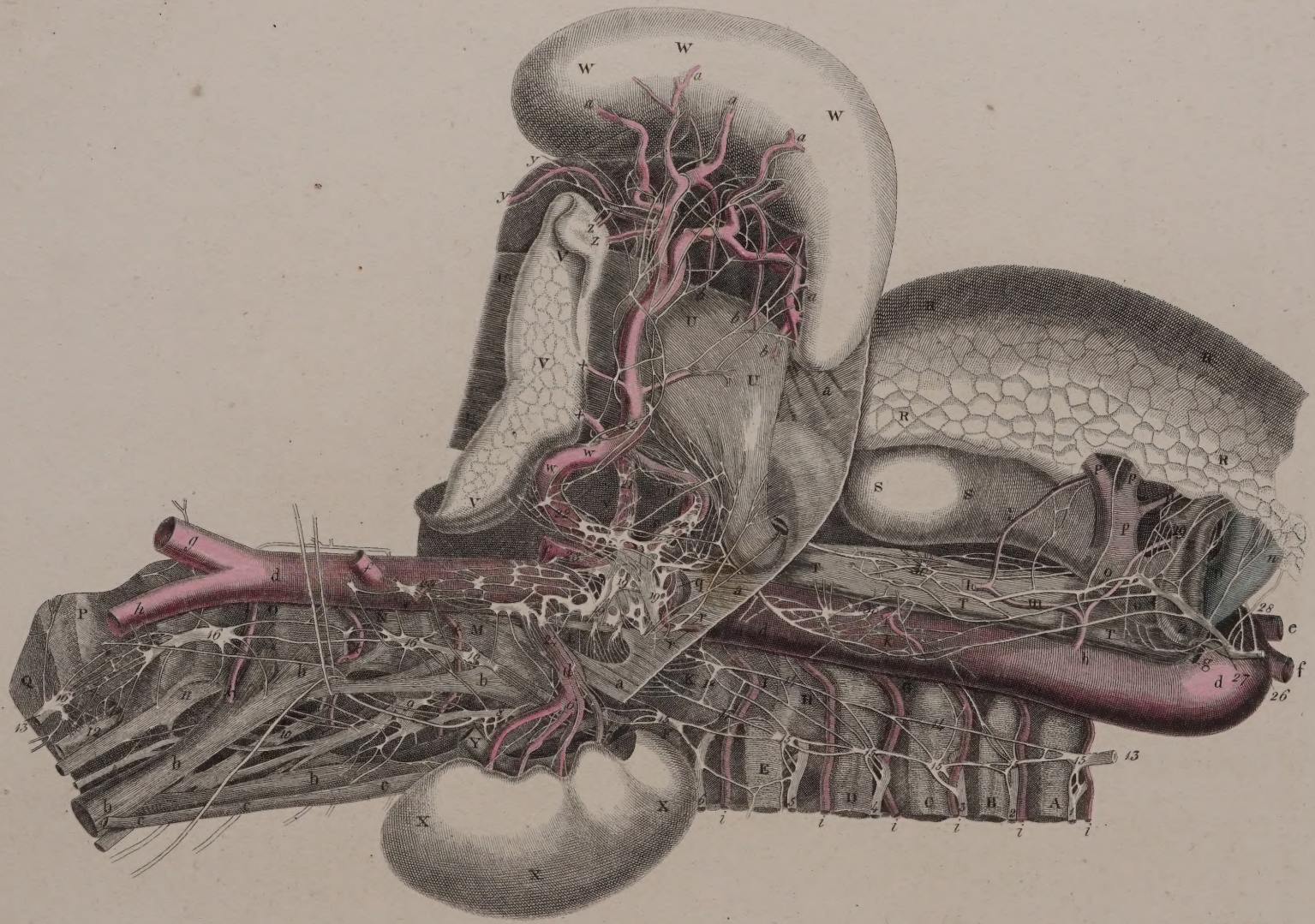


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PLATE IX.

This shows the Sympathetic and Pneumo-Gastric Nerves of the left side. The part of the Sympathetic Nerve represented, extends from below the sixth Rib to the first bone of the Sacrum.

A. The seventh rib.
B. The eighth rib.
C. The ninth rib.
D. The tenth rib.
E. The eleventh rib.
F. The twelfth rib.
G. The ninth dorsal vertebra.
H. The tenth dorsal vertebra.
I. The eleventh dorsal vertebra.
K. The twelfth dorsal vertebra.
L. The first lumbar vertebra.
M. The second lumbar vertebra.
N. The third lumbar vertebra.
O. The fourth lumbar vertebra.
P. The fifth lumbar vertebra.
Q. The first bone of the sacrum.
R, R, R, R. The left lung.
S, S. The pericardium containing the heart.
T, T, T. The Oesophagus.
U, U, U, U. The stomach.
V, V, V. The pancreas.
W, W, W. The spleen.
X, X, X. The left kidney.
Y. The ureter.
Z, Z. The left bronchus.
a, a, a. The diaphragm.
b, b, b, b, b, b. The psoas magnus muscle. The fibres have been split up and separated from each other, to show distinctly the exit of the lumbar nerves and the origin of the lumbar ganglions.
c, c, c. The psoas parvus.
d, d, d. The aorta.
e. The left carotid artery.
f. The left subclavian.
g. The remains of the ductus arteriosus.
h. The superior left bronchial artery.
i. The Oesophageal artery from which arises
k. The inferior left bronchial artery, cut.
l, l. The inferior left bronchial artery, cut at its origin from the artery i, going to the left bronchus.
m. Anastomosis between the superior and inferior left bronchial arteries.
n, n. Left pulmonary artery.
o, o. Left venous sinus.
p, p, p, p, p. Pulmonary veins.
q. Trunk of the coeliac artery.
r, r. Left phrenic artery.
s. The common trunk of the left hepatic artery and coronaria ventriculi.
t. Left hepatic artery.
u. Coronaria ventriculi.
v. Right hepatic artery.
w, w. Splenic artery.
x, x. Prancreatic branches.
y, y. Arteria gastro-epiploica sinistra.
z, z. Twigs from the last artery to the pancreas.
a, *a*, *a*, *a*. Proper splenic branches.
b, *b*, *b*. Vasa brevia.
c. Trunk of the superior mesenteric artery.
d. Left renal artery.
e. Left spermatic artery.
f. Inferior mesenteric artery.
g. Right common iliac artery.
h. Left common iliac artery,
i, *i*, *i*, *i*, *i*, *i*. The fourth, fifth, sixth, seventh, eighth, and ninth aortic intercostal arteries.
k, *k*, *k*. The third, fourth, and fifth lumbar arteries.
1. Sixth intercostal nerve of the left side.
2. Seventh intercostal nerve.
3. Eighth ————————
4. Ninth ————————
5. Tenth ————————
6. Eleventh ————————
7. Twelfth ————————
8. The first lumbar nerve.
9. The second ————————
10. The third ————————
11. The fourth ————————
12. The fifth ————————
13. The sympathetic nerve of the left side extending from below the sixth rib to the first bone of the sacrum.

14, 14. The greater splanchnic nerve. This rises by four or five roots from the inner part of the sixth, seventh, eighth, ninth and sometimes the tenth thoracic ganglions.

15, 15, 15, 15, 15, 15. The sixth, seventh, eighth, ninth, tenth, and eleventh thoracic ganglions of the sympathetic nerve.

16, 16, 16, 16. The first, second, third, and fourth lumbar ganglions of the sympathetic nerve.

17. The smaller splanchnic nerve.

18. Anastomosis between the smaller and the greater splanchnic nerves.

19, 19, 19. The Coeliac ganglions composing the solar plexus.

20. Plexus surrounding the common trunk of the left hepatic artery and the coronaria ventriculi.

21. Plexus surrounding the right hepatic artery.

22, 22. The splenic plexus; some of the filaments of this plexus enter the pancreas with the pancreatic branches of the splenic artery, others accompany the left gastro-epiploic artery, and are partly lost in the great omentum.

23. The superior mesenteric plexus.

24. The renal plexus.

25. Spermatic plexus.

26. The trunk of the pneumo-gastric nerve, left side.

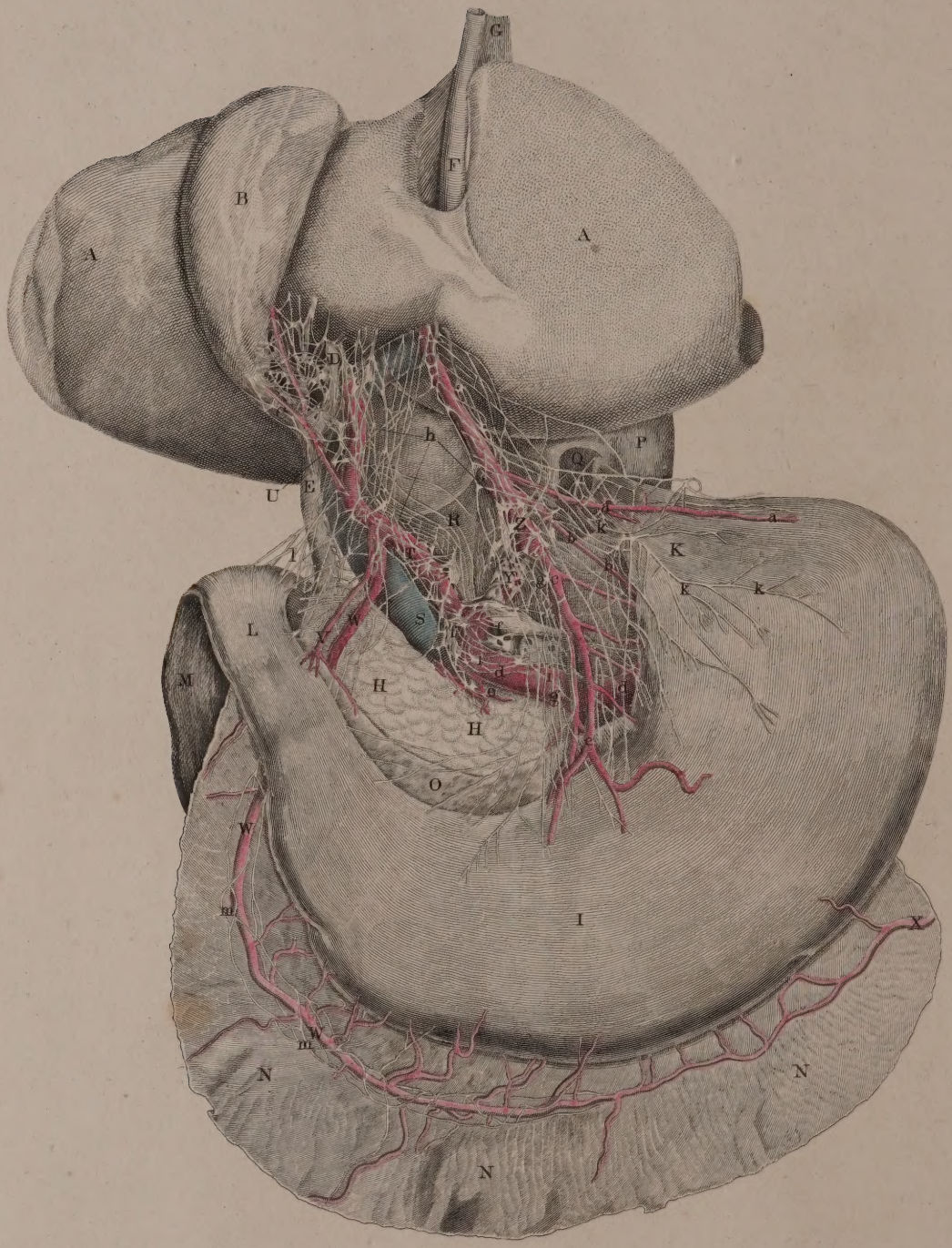
27. The recurrent laryngeal turning up behind the arch of the aorta.

28. Cardiac branches of the pneumo-gastric.

29. Branches of the pneumo-gastric nerve to the lungs forming the posterior pulmonary plexus. After having given off the pulmonary branches, the different filaments into which the pneumo-gastric nerves had been separated again unite to form two long cords which run down along the oesophagus, and freely communicate with each other forming

30, 30. The œsophageal plexus.

The pneumo-gastric nerves now enter the abdomen by passing through the diaphragm along with the oesophagus, and are distributed to the stomach and the neighbouring organs, intermixing with the numerous productions of the solar plexus.

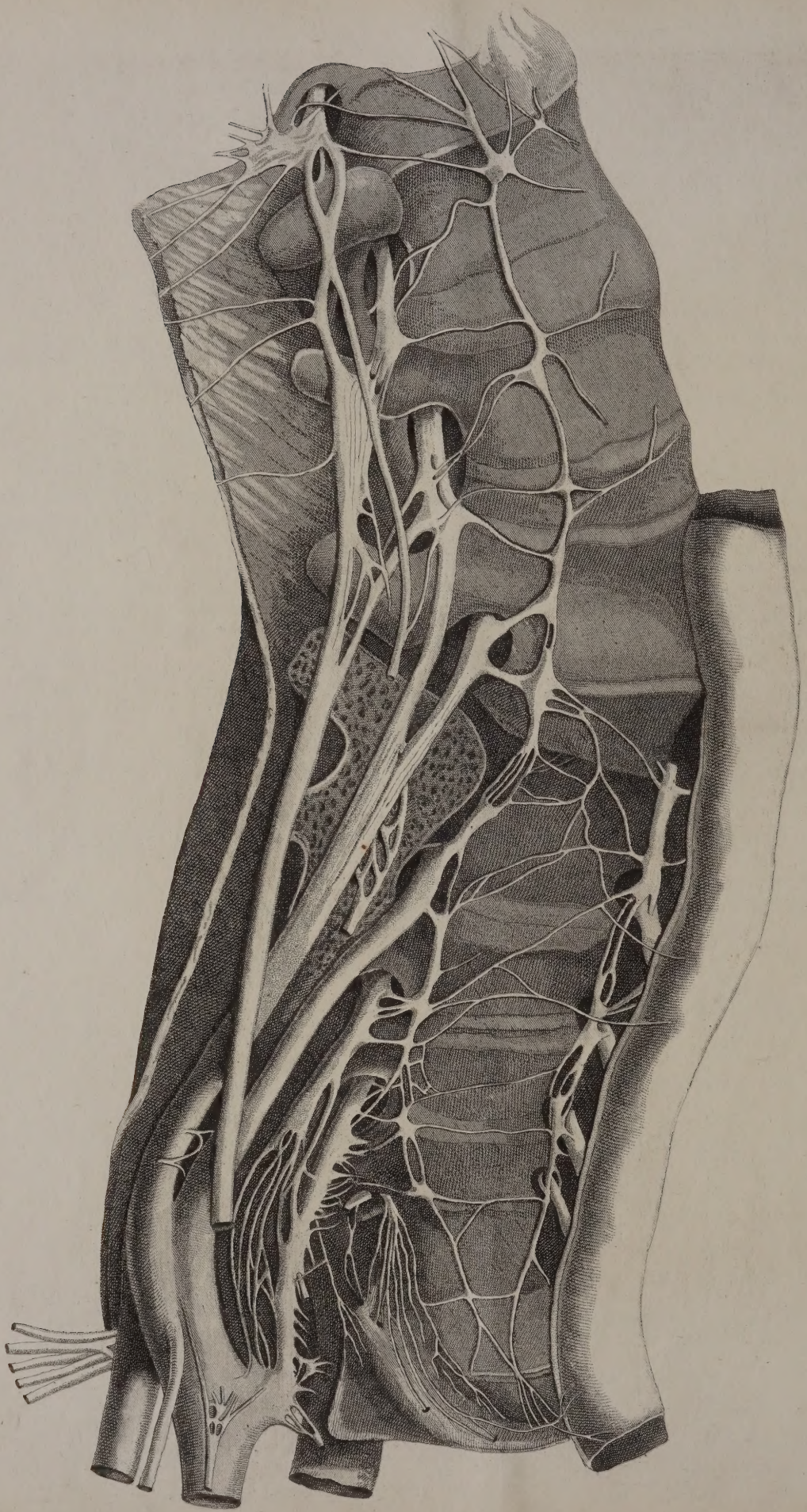


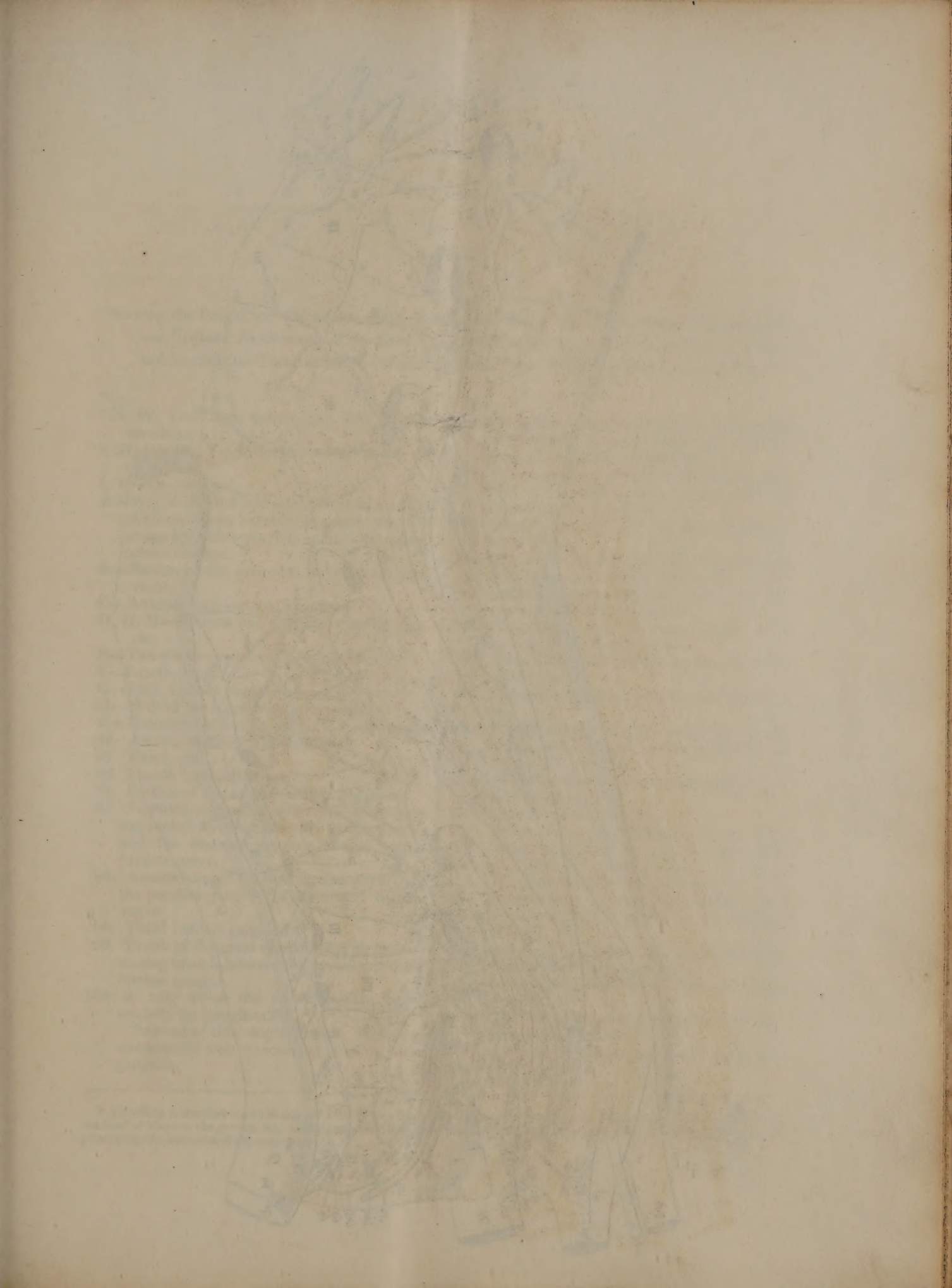
E. Mitchell, sculp.

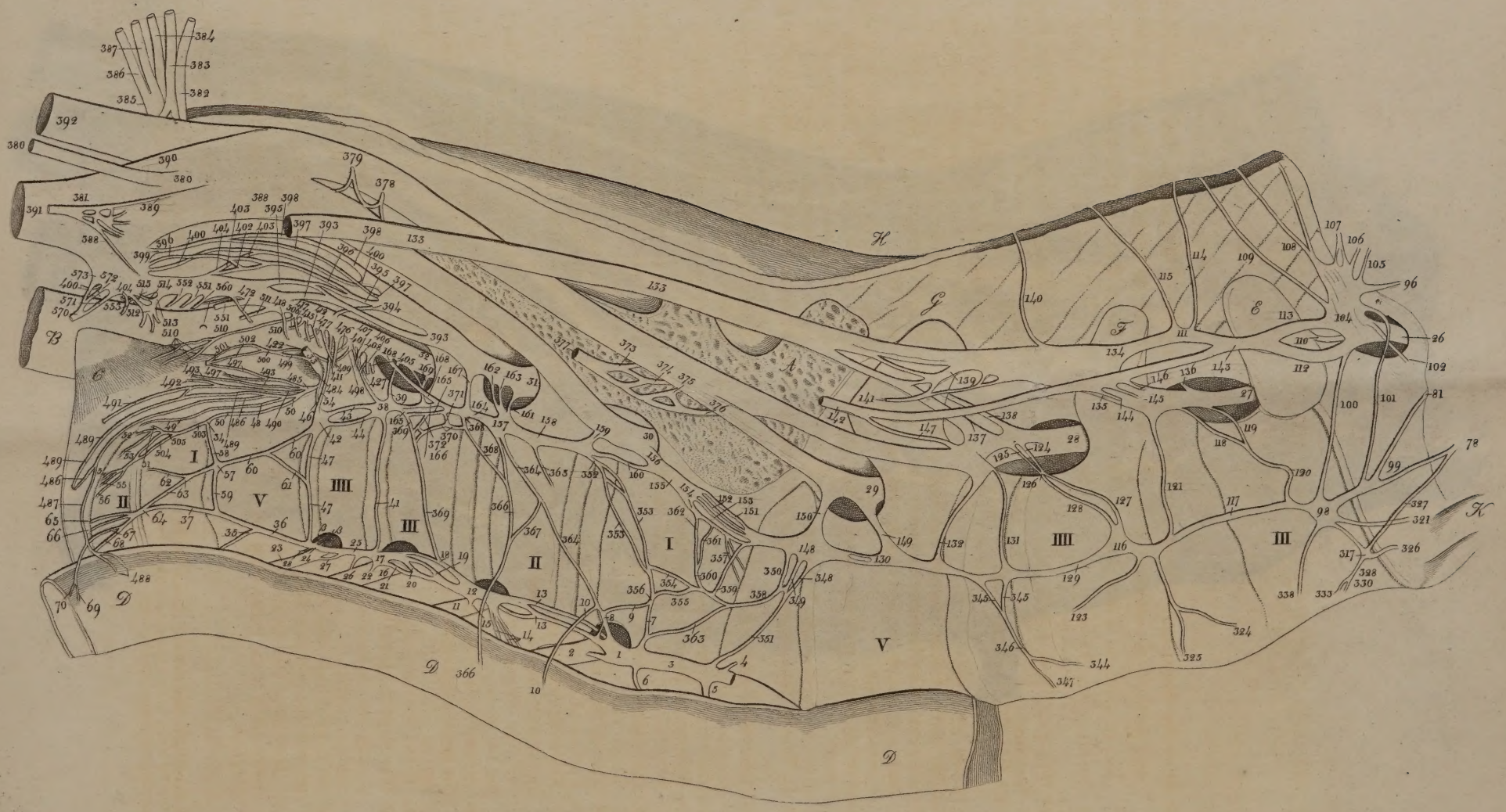
PLATE X.

This exhibits the Nerves of the Liver and Stomach from the Solar Plexus, which could not be so well expressed in the preceding Plates.

A, A. The liver.
B. The gall-bladder.
C. Cystic duct.
D. Hepatic duct.
E. Ductus communis choledochus.
F. Round ligament of the liver.
G. Broad ligament.
H. H. The pancreas.
I. The stomach.
K. Cardiac extremity of the stomach.
L. Pylorus.
M. Duodenum.
N, N, N. A portion of the large omentum.
O. A portion of the small omentum.
P. Part of the diaphragm.
Q. Opening of the diaphragm for the passage of the oesophagus.
R. Vena cava.
S. Trunk of the vena portæ.
T. Right hepatic artery.
U. Cystic artery.
V. Pyloric artery.
W, W, W. Right gastro-epiploic artery.
X. Cut trunk of the left gastro-epiploic artery.
Y. Common trunk of the left hepatic artery and the coronaria ventriculi, surrounded by nerves and ganglions.
Z. Left hepatic artery.
a, a. Cardiac artery from the left hepatic.
b, b. Branch from the left hepatic artery to the stomach.
c, c, c. The coronaria ventriculi.
d, d. The splenic artery.
e. Pancreatic artery.
f, f. Coeliac plexus.
g, g. Coronary plexus of the stomach.
h. Hepatic plexus.
i, i. Splenic plexus.
k, k, k. Branches of the pneumo-gastric nerve.
l. Branches from the hepatic plexus to the duodenum.
m, m. Gastro-epiploic nerves from the hepatic plexus.






A
B
C
D
E
F
G
H
I
II
III
V

Showing the Origin and Connexion of the Lumbar and Sacral Nerves, the free Communication and frequent Anastomosis of the great Sympathetic of the Right with that of the Left Side, and its ultimate Termination.*—WALTER, *Tab. Nerv. Thor. et Abdom.—Tab. I. Fig. 2.*

No.
III, IV, V—Third, fourth, and fifth lumbar vertebrae.
I, II, III, IV, V—Five false vertebrae of the os sacrum.
I, II—Os coccygis.
A—Part of the first and second vertebrae of the os sacrum sawn laterally to expose the foramina by which the first and second sacral nerves emerge.
B—Portion of the posterior sacro-sciatic ligament.
C—Anterior sacro-sciatic ligament.
D, D, D—Rectum cut near the sphinter muscle.
E—Transverse processes of the third,
F—Fourth, and,
G—Fifth lumbar vertebrae.
H—Skin of the haunch and perinaeum.
K—External and middle crus of the diaphragm.
26. Anterior branch of the second,
27. Third, and,
28. Fourth lumbar nerves.
78. Portion of the second lumbar ganglion.
81. Filament originating from the anastomosing branch between the first lumbar nerve and the singular ganglion of the second lumbar nerve.
96. Anastomosis of the first lumbar nerve with the peculiar ganglion of the second lumbar nerve.
98. Third lumbar ganglion.
99. Trunk of the great sympathetic, or anastomosing branch, between the second and third lumbar ganglia.
100. A twig which the second lumbar nerve sends to the ganglion 98.
Instead of this single branch, there are occasionally two proceeding to the same ganglion.

No.
101. Anastomosing branch between the singular ganglion of the second lumbar nerve and the trunk of the great sympathetic.
102. Communicating branch between the ganglion of the second lumbar nerve and the second lumbar ganglion.
104. Singular ganglion of the second lumbar nerve 26.
105, 106, 107, 108, 109. Muscular twigs arising from this ganglion, and proceeding to the quadratus lumborum, psoas major and minor, and abdominal muscles.
110. Posterior branch of the second lumbar nerve running to the dorsal muscles.
111. Anastomosis between the second and third lumbar nerves.
112. Superior root arising from the lumbar nerve 26.
113. Inferior branch from the ganglion of the lumbar nerve by which anastomosis III. is composed.
114, 115. Muscular branches proceeding to the psoas major muscle.
116. Fourth lumbar ganglion.
117. Trunk of the great sympathetic, or communicating branch between the third 27, and fourth 28, lumbar nerves.
118, 119. Two branches uniting into
120. A single twig, by which the trunk of the sympathetic, 117, is joined to the lumbar nerve 27.
121. Branch of the nerve 27, communicating with the trunk of the nerve 117.
123. A filament running to the ligaments of the vertebrae.
124, 125. Two anastomosing twigs of nerve 28. uniting midway into
126. An intermediate ganglion, and again dividing into

* Unwilling to interfere with the original Plate of WALTER, FISCHER, from whose work this Plate is taken, has superadded, in the form of Notes to the general text, those variations in the origin and distributions of these nerves which he has met with in prosecuting the dissection of the same parts.

No.
127, 128. Two branches, to unite with the fourth lumbar ganglion, 116.
129, 130. Trunk of the great sympathetic, or communicating branch between the fourth and fifth lumbar ganglia.
131. First anastomosing branch.
132. Second communicating branch of the nerve 28 with 129 and 130.
133. Crural nerve.
134. The origin, or first root of the crural nerve, from the anastomosis between the second and third lumbar nerves III.
135. The commencement, or second thick root of the crural nerve from the anterior branch of the third lumbar nerve 27.
136. Posterior branch of the third lumbar nerve.
137. Origin, or third root of the crural nerve from the fourth lumbar nerve.
138. Posterior twig of the fourth lumbar nerve.
139. Anastomosis between the second and third roots of the crural nerve.
140, 141. Cutaneous branches of the crural nerve.
142. Obturator nerve.
143. Origin, or first root of the obturator nerve, from the nerve III.
144, 145, 146. Second root of the obturator nerve, composed of three branches from the third lumbar nerve.
147. Third root from the fourth pair of lumbar nerves.
148. Fifth lumbar ganglion.
29. Anterior branch of the fifth pair of lumbar nerves.
149. Communicating branch of the fifth lumbar nerve 29, with the trunk of the sympathetic 130.
150. Twig of the fifth lumbar nerve proceeding to the fourth lumbar ganglion.
151, 152, 153, 154. Four anastomosing nerves arising from the last lumbar ganglion, which, uniting into one, form the
155, 156. First communicating branch with the first sacral nerve 30.

The twigs 151, 2, 3, and 4, perform on the right side the function of the trunk of the sympathetic, and must be considered as the first sacral ganglion.

30. Anterior branch of the first sacral nerve.
157. Second sacral ganglion.
158. Trunk of the sympathetic or anastomosing branch between the first and second sacral ganglia.
159. Second thick root of the first sacral nerve communicating with the trunk of the sympathetic, 158.

No.
160. Anastomosis between the first, 156, and second root of the first sacral nerve.
31. Second right sacral nerve.
161, 162, 163. Three branches arising from the second sacral nerve, and proceeding to the second sacral ganglion, 157.
164. Trunk of the great sympathetic or communicating branch between the second sacral ganglion, 157, and the third right sacral ganglion, 38.
165, 165. Internal branch of nerve 164.
166. External branch of nerve 164.
167. Root of the second sacral nerve communicating with the nerve 164.
168, 168. First branch of the third sacral nerve anastomosing with the nerve 166.
32. Third sacral nerve of the right side.
169 Second branch of the third sacral nerve bifurcated, and communicating with nerve 166.
317. Second accessory lumbar ganglion.
321. Anastomosis of the first accessory lumbar ganglion with the third lumbar ganglion 98.
324. Anastomosis of the hypogastric branch with the nerve 117.
325. Twig which runs to the muscular tunic of the interlumbar artery.
326. Communication of the second accessory lumbar ganglion with the next nerve.
327. Communication of the second lumbar accessory ganglion with the great sympathetic.
328. Hypogastric branch of the second accessory lumbar ganglion.
330. Internal branch of the hypogastric nerve.
333. External branch of the hypogastric nerve.
338. Hypogastric branch of the third lumbar ganglion 98.

Besides this nerve we have observed another arising from this ganglion. These accessory ganglia are not always to be found.

344. Posterior branch of nerve 338, or the communicating twig with the trunk of the sympathetic.
345, 345. Branches arising from the great sympathetic nerve 129, 130, and composing the
346, 347. Communicating nerve, which the sympathetic of the right side sends to that of the left, between the fourth and fifth lumbar vertebrae, and behind the iliac arteries.

This communication is not always present.

348, 349, 350. Twigs from the fifth lumbar ganglion uniting into
351, A single anastomosing branch with the

No.

trunk of the sympathetic of the left side, and which is joined by an elegant anastomosis with the trunk of the sympathetic of the right side.

352, Anastomostic branch of nerve 159, which, dividing into

353, 353, Two branches, is afterwards joined into one, by which the

354, 355, Two anastomoses, with the nerve 358, are established.

356. Remainder of the trunk of nerve 353, inserted into the first sacral ganglion of the left side.

357. Twig arising from nerve 154, and sending its branches to the muscular coat of the branches of the hypogastric artery.

358. Anastomosis between the nerves 348, 349, 350, and 354 and 355. From this communication there first occurs a

359, Communicating twig with nerve 154.

We have observed this twig bifurcated, and enlarged by the addition of another branch from nerve 350.

360. A bifurcated filament of nerve 358, of which the first twig is inserted into nerve 154, and the second into nerve 155.

We have found the twig 360 a simple branch, and its divisions, as above, have never been observed by us.

363. A branch arising from nerve 358, and communicating with the first sacral ganglion of the left side.

364, 364, A communicating nerve with the first sacral ganglion of the left side, which the ganglion 157 sends off.

365. A small branch spent upon the rectum, and cut near the inclination of that gut to the left side of the body.

366, 366. Twig of the second sacral ganglion 157, proceeding to that surface of the rectum lying upon the sacrum.

367. Anastomosis between the filaments 364 and 366.

We have observed occasionally, in the room of this communication, a twig arising from nerve 364, and running to the same surface of the rectum.

368, 368. Filament arising from nerve 164, and inserted into nerve 366.

369, 369. A branch springing from nerve 165, and uniting with the trunk of the sympathetic of the left side.

370. Communication between nerves 368 and 369.

371. Conjunction of nerve 165 with nerve 370.

372. Anastomosis of nerves 165 and 369.

No.

373, 374, 375, 376. Branches of the fourth and fifth lumbar nerves uniting to form a

377, Muscular branch running to the glutæus medius, and especially to the glutæus minimus and tensor vaginæ femoris.

378. Muscular branch to the pyramidalis muscle.

379. Muscular twig to the glutæus medius.

380, 380. Inferior gluteal cutaneous nerve, which descends as far as the middle of the leg.

381. A muscular filament giving its branches to the gemellus superior and inferior, obturator internus, and quadratus femoris muscles.

382, 383, 384. Twigs to the glutæus maximus.

385. Trunk of the inferior cutaneous nerve of the haunches, dividing into two branches.

386. Superior branch of the inferior cutaneous nerve of the haunches, which, after giving many twigs to the skin of that region, terminates upon the skin where the glutæus maximus is inserted into the bone.

387. Inferior branch of the same nerve 385, terminating nearly in the same manner as the preceding, after sending off many filaments.

It sometimes happens that the nerve 385 divides a little lower down than this.

388, 388, 389, 390. Trunk, or plexus, so called, of the great sciatic nerve, formed by the union of the fourth and fifth lumbar, and first, second, and third sacral nerves.

391, Great branch of the sciatic nerve.

392. Small branch of the sciatic nerve.

393. 393. The first anastomosis between the second and third sacral nerves.

394, 394, Second anastomosis between the same nerves.

395, 395, Third anastomosis between the second and third sacral nerves.

396, 396. First branch which the sciatic nerve receives from the second sacral nerve.

397, 397, 398, 398. Second and third twigs of the second sacral nerve uniting to form one large branch, and terminating in the trunk of the sciatic nerve, 388.

400, 400, 400. Middle cutaneous nerve of the haunches originating from the second branch of the sciatic nerve 397, and ending in the middle of the skin of the haunches.

401, 402. Twigs from the nerve 396, 396, uniting with a

403, 403, Filament coming from nerve 400, to constitute

404, 404, The superior cutaneous nerve of the hips, which terminates in the skin covering the gluteal muscles.

405, First hypogastric branch, which the third

No.

pair of sacral nerves sends to form the hypogastric plexus, from which the nerves of the bladder of urine, vagina, uterus, and rectum originate.

406. Second hypogastric branch of the third sacral nerve.

407. Third hypogastric branch.

408, 409. Fourth and fifth hypogastric branches, which join to form

410, A single nerve.

411, 412, 415. Sixth, seventh, and eighth hypogastric branches.

417, 418. Ninth and tenth hypogastric branches.

The number of these nerves, forming the hypogastric plexus, is subject to the greatest variety; we sometimes find many of them, sometimes very few.

133. Fourth sacral nerve of the right side.

422. Trunk of the fourth right sacral nerve cut.

427. Filament of the third sacral nerve, entering into a free anastomosis with the fourth sacral nerve.

472. The uterine nerve proceeding with the uterine artery to the uterus.

476. Branch arising from the third sacral nerve, which, uniting with

477, A branch from the fourth pair of sacral nerves, composes the muscular nerve of the levator ani muscle.

484. Trunk of the fourth sacral nerve, from which not only three perforating nerves originate, but likewise communicating filaments with the fourth sacral ganglion, and with the fifth or last sacral nerve.

485. Common trunk of the second and third perforating nerves, 490 and 493.

486. Internal branch of the first perforating nerve, or external hemorrhoidal nerve. From which arises

487, 488, A twig terminating in the rectum.

489, 489. External twig of the first perforating nerve.

490, Second perforating branch, dividing immediately into two filaments. One of which

491, A cutaneous branch, perforates the interspinal ligament, and terminates in the skin of the coccyx. The other

492, Is a musculo-ligamentous branch, ending in the interspinal ligament.

493, 493. Third perforating nerve, concluding a little externally and superiorly in the skin of the coccyx, after giving off

497, 497, A muscular twig, which terminates in the longissimus dorsi, and sacro-lumbalis and coccygeal muscles.

498. First branch of the fourth perforating nerve, arising from the third sacral.

No.

499. Second twig of the perforating nerve, originating from the fourth sacral.

500. Conjunction of these filaments.

501. Inferior twig of the perforating nerve, terminating in the skin which covers the lateral parts of the glutæus maximus, where it adheres to the bones of the coccyx.

502. Superior filament of the perforating nerve, ascending and terminating in the skin covering the glutæus maximus muscle, where it adheres to the third, fourth, and fifth false vertebrae of the coccyx.

503. Trunk of the fifth sacral nerve.

504, 505. Branches of the fifth sacral nerve, ending in the interspinal ligament and sacro lumbalis, and longissimus dorsi muscles.

506. Muscular branch arising from the third sacral nerve, and dividing into two filaments.

510, 510, 511. Musculo-ligamentous twigs terminating in the sacro-lumbalis and longissimus dorsi muscles, and interspinal ligaments.

512. Superior pudic nerve.

513, 514, 515. Branches of the pudic nerve, by which it arises from the third sacral.

531. Trunk of the internal hemorrhoidal nerve, originating from the third sacral, and dividing into three filaments.

(Nerve proceeding to the posterior sacro-sciatic ligament.

34. Fifth and last sacral nerve of the right side.

351, 352, 353. Pudic nerves.

Occasionally the nerve 551 joins with the nerve 553, and sends its branches to the extremity of the labia pudendi.

These nerves are liable to the greatest variety in their origin.

560. A branch which is sent to the lateral parts of the skin of the haunches, near the vagina.

570. Inferior or long pudic nerve, arising by

571, 572, 573, Three roots from the origin of the great sciatic nerve.

1. Ganglion of the first sacral nerve of the left side.
2. First left sacral nerve.
3. Trunk of the left sympathetic, or communicating nerve between the first sacral ganglion and the fifth left lumbar ganglion.

4, 5, 6. Filaments which the sympathetic sends to the hypogastric arteries.

7. Anastomosis of the first left lumbar ganglion with nerve 352 of the right side; hence the first sacral ganglion of the left side communicates with the second branch of the first sacral nerve of the right side, performing the function of the first sacral

No.

ganglion, through the medium of the nerves 352, 353, 356.

8. Anastomosis of the first sacral ganglion of the left side with branch 364 from the second sacral ganglion of the right side.
9. Communication between nerves 8 and 7.
10, 10. Twig of nerve 8 running to the rectum.
11. Second sacral nerve of the left side.
12. Second left sacral ganglion.
13. Trunk of the sympathetic or anastomosing nerve between the first 1 and second 12 sacral ganglia of the left side.
14. Arterial twigs of the second sacral ganglion proceeding to the branches of the hypogastric artery.
15. A twig from the trunk of the second sacral nerve 11, to the second sacral ganglion 12. We have occasionally seen two branches of communication instead of one.
16. Third sacral nerve of the left side.
17. Third left sacral ganglion.
18, 19, 20, 21. Trunk of the left sympathetic or communicating nerve between the third and second left sacral ganglia.
22. Twig of the third sacral ganglion 17, uniting with the trunk of the third sacral nerve, 13, of the left side.
23. Fourth left sacral nerve.
24. Fourth sacral ganglion of the left side.
β, β. Two filaments running from the fourth left sacral nerve to the fourth ganglion.
25. Trunk of the sympathetic, or anastomosing nerve, between the fourth and third sacral ganglia of the left side.
26. Communicating twig of the left sympathetic, with the third sacral nerve of the left side.
27. Anastomosing filament of the trunk of the left sympathetic with the fourth, left sacral nerve, 23.
28. Trunk of three perforating nerves.
35. Fifth sacral nerve of the left side.
36. Trunk of the left sympathetic, or communicating nerve between the fourth left sacral ganglion and the fifth left sacral nerve.
37. Termination and union of the great sympathetic nerve of the left side with that of the right.
38. Third right sacral ganglion.
39, 40. Branches which the third sacral ganglion receives from the trunk of the third sacral nerve 32.—Instead of the filament 39, we have remarked two slender twigs running to that ganglion from the sacral trunk.
41. Anastomosis of the third sacral ganglion of

No.

the right side with the third sacral ganglion 17 of the left.

We have had occasion to observe between this anastomosis and that of 369, two other small communicating filaments; so that these anastomoses of 41 and 369 were firmly united twards its middle part.

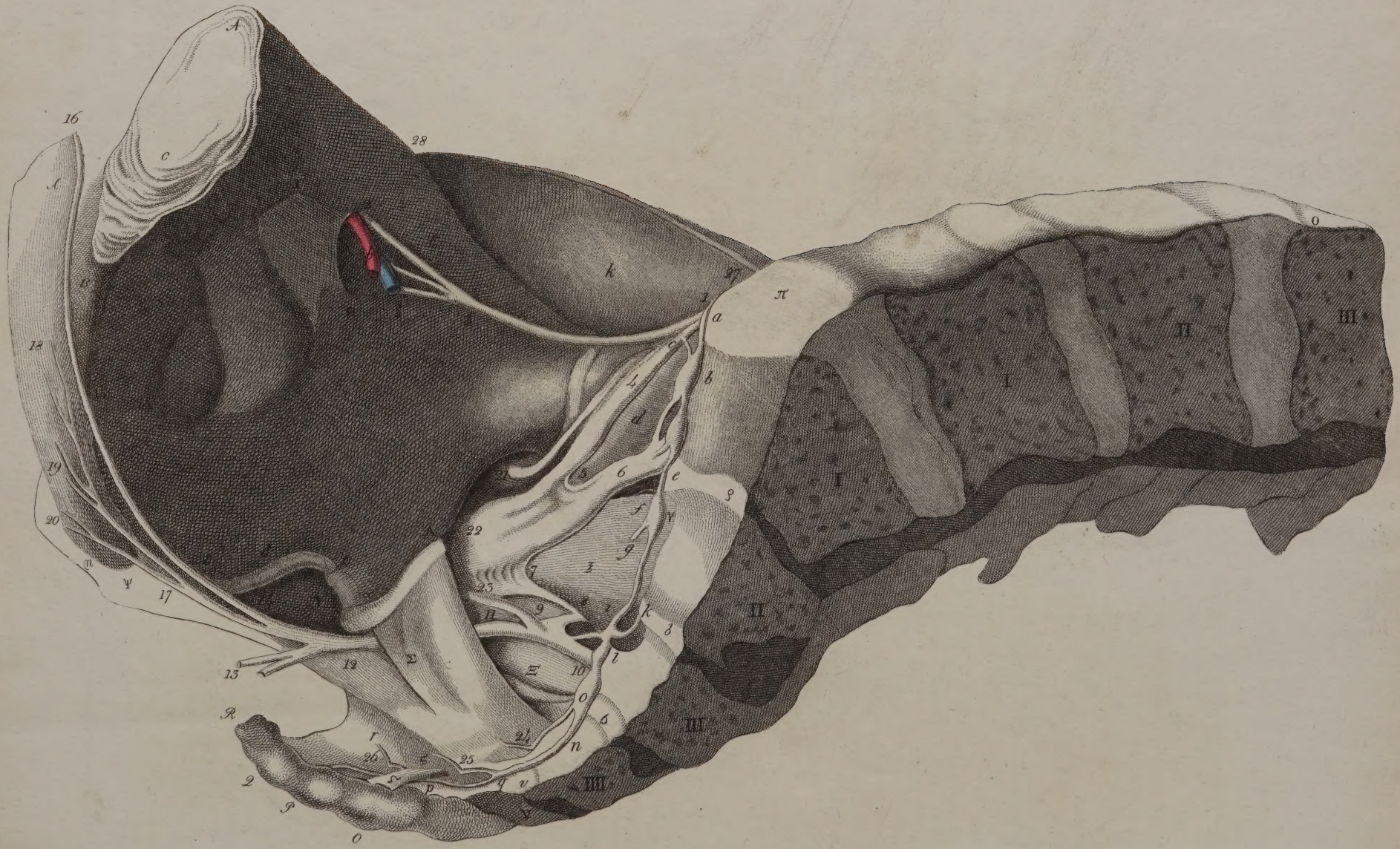
42. Fourth right sacral ganglion.
43, 44. Trunk of the right sympathetic or communicating nerve between the third and fourth sacral ganglia.
45. Filament of the fourth sacral ganglion of the right side, which it receives from the third right sacral nerve 33.
46. Twig which the right fourth sacral ganglion derives from the fourth sacral nerve of the right side.
47, 47. Anastomosis between the right and left fourth sacral ganglia.

We once remarked filaments 44 and 47 united together by another branch.

48, 49. Twig sent to the posterior sacro-sciatic ligament.
50, 50. Communication of nerve 484 with the fifth sacral nerve of the right side.
51, 52, 53, 54, 55, 56. Branches of the fifth right sacral nerve terminating by very minute filaments in the posterior sacro-coccygeal ligament.
57. Fifth sacral ganglion of the sympathetic, a single ganglion, to which in the right side the fifth sacral nerve sends a
58. Communicating filament.

The fifth sacral ganglion of the sympathetic is frequently so small, that it hardly merits the name of ganglion.

59. A communicating filament which the same ganglion on the left side receives from the sacral nerve 35.
60, 60. Trunk of the right sympathetic or anastomosing nerve between the fourth and fifth single sacral ganglia.
61. Communication between nerves 60 and 47.
62. Filament arising from ganglion 57, and terminating in the posterior coccygeal ligament.
63. Final termination of the right sympathetic.
64. Coccygeal ganglion, in which the right and left sympathetics are united.
65, 66, 67, 68. The last branches which the ganglion 64 sends off, and which by very minute filaments end in the extremity of the posterior coccygeal ligament.
69, 70. A twig implanted into the termination of the intestinum rectum.


A
16
28
c
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27
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III
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I

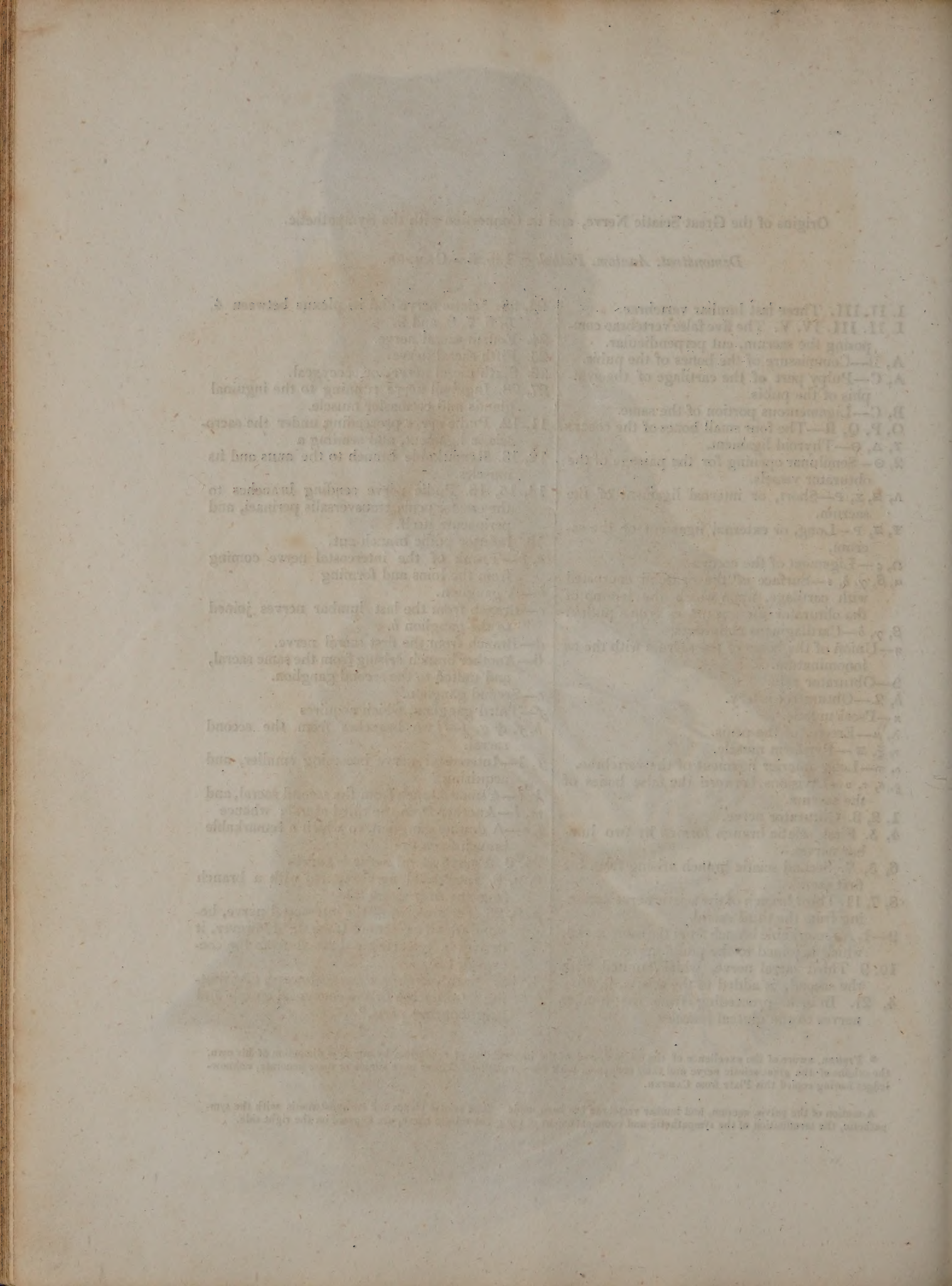
Origins of the Great Sciatic Nerve, and its Connection with the Sympathetic.

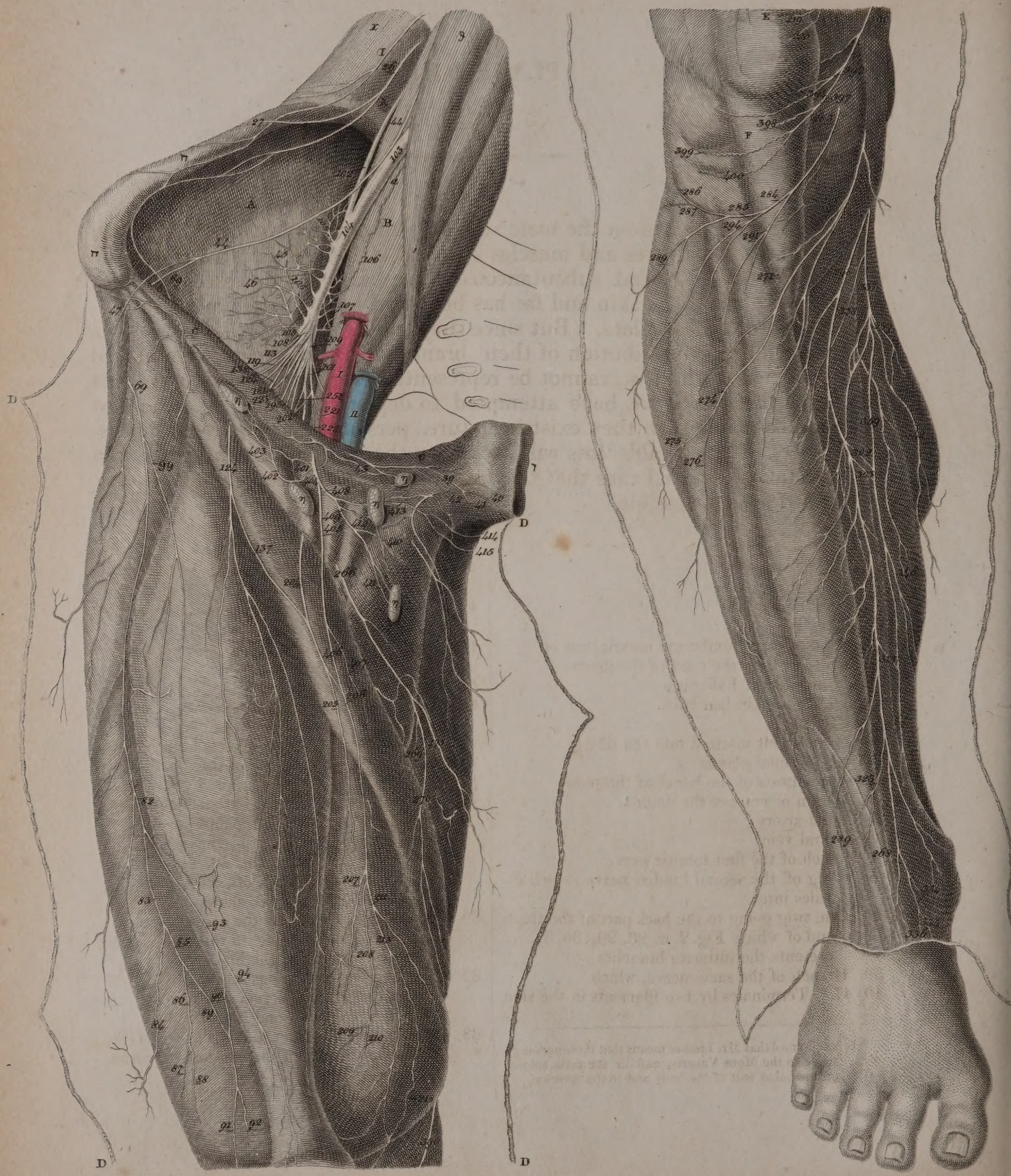
Demonstrat. Anatom. Patholog. Lib. ii.—CAMPER.

I. II. III. Three last lumbar vertebrae.
I. II. III. IV. V. The five false vertebrae composing the sacrum, cut perpendicular.
A, B—Commissure of the bones of the pubis.
A, C—Pulpy part of the cartilage of the symphis of the pubis.
B, C—Ligamentous portion of the same.
O, P, Q, R—The four small bones of the coccyx.
ϒ, Δ, Θ—Thyroid ligament.
2, Θ—Semilunar opening for the passage of the obturator vessels.
Λ, Ξ, Σ, P—Short, or internal ligament of the sacrum.
Ψ, Ξ, P—Long, or external ligament of the sacrum.
Ω, ς—Ligament of the coccyx.
α, β, γ, δ, ε—Surface of the os ischii encrusted with cartilage, upon which the tendon of the obturator internus moves as on a pulley.
β, γ, δ—Cartilaginous eminences.
η—Union of the bones of the sacrum with the os innominatum.
Θ—Obturator vein.
b, 2.—Obturatrix artery.
κ—Psoas muscle.
λ, μ—Erector of the penis.
ν, ξ, Ξ—Pyriform muscle.
ο, π—Long anterior ligament of the vertebrae.
ϱ, σ, τ, υ—Divisions between the false bones of the sacrum.
1, 2, 3. Obturator nerve.
4, 5. First sciatic branch formed by two lumbar nerves.
6, 5, 7. Second sciatic branch arising from the first sacral.
8, 7, 11. Third branch of the sciatic nerve springing from the third sacral.
9—1. A remarkable branch from the same sacral, which is joined to the pudic nerve.
10, 9 Third sacral nerve, which, united with the second, is added to the sciatic, 9, 23.
4, 21. Branch proceeding from the lumbar nerves to the gluteal muscles.
22, 23. Sciatic nerve and its plexus between 4, 5, 6, 7, 8, and 9.
24. Fourth sacral nerve.
25. Fifth sacral nerve.
26. Sixth sacral nerve, or coccygeal.
27, 28. Inguinal nerve running to the inguinal glands and cremaster muscle.
11, 12. Pudic nerve proceeding under the sacro-sciatic ligament, and sending a
12, 13. Remarkable branch to the anus and its muscles.
14, 15, 16. Pudic nerve sending branches to the erector penis, transversalis perinaci, and perinaeum itself.
19. Inferior pudic branch cut.
a, *b*—Trunk of the intercostal nerve coming from the loins and forming
b—A ganglion.
c—Branch from the last lumbar nerves joined to the ganglion *b*.
d—Branch from the first sacral nerve.
6—Another branch arising from the same sacral, and united to the second ganglion.
e—Second ganglion.
f—Third ganglion, which acquires
h, *f*, & *g*, *f*—Two branches from the second sacral.
f, 1—Intercostal nerve becoming smaller, and acquiring
k, *l*—A small branch from the second sacral, and
m, *l*—Another from the third sacral; whence
l, *o*—A double ganglion, to which a remarkable branch from the
24, 0. Fourth sacral nerve is added.
0, *n*, 9. Intercostal nerve, united with a branch from the fifth sacral 25.
p. 9, 26. Termination of the intercostal nerve, beyond which we cannot trace it. However, it derives a remarkable branch from the coccygeal, 26.
1, 26. Sixth sacral or coccygeal nerve, distributing its branches to the coccygeal muscle and neighbouring parts.*

* FISHER, aware of the excellence of the original, and of the impossibility of rendering, by any new dissection of his own, the origins of the great sciatic nerve and their connexion with the sympathetic either more simple or more accurate, acknowledges having copied this Plate from CAMPER.

A section of the pelvis, sacrum, and lumbar vertebrae has been made. The sciatic plexus and its anastomosis with the sympathetic, the termination of the sympathetic and commencement of the great sciatic nerve, are exposed on the right side.





E. Mitchell Sculp.t

PLATE XIII.

This Figure, taken from the male subject, shows the right thigh, leg, and foot, besides some nerves and muscles situated in the pelvis, and also some superficial cutaneous and subcutaneous nerves and blood-vessels, such as meet the eye when the skin and fat has been laid back and removed carefully from above the fascia lata. But since the small size of the nerves, and the extremely minute distribution of their branches in this greatly diminished representation of the foot, cannot be represented even by the most excellent artist, for this reason we have attempted to depict these nerves somewhat larger and thicker than they exist in nature, persuaded, that, from this circumstance, no irreparable loss will accrue to the studious in anatomy; but we have taken especial care that the situation of the nerves should be preserved as far as is possible.

A. Iliacus internus.
B. Psoas magnus.
S. Psoas parvus.
ι. Its tendon.
κ. The quadratus lumborum muscle, cut off.
λ. Its origin from the crest of the ileum.
CC. Ligament of Fallopius.
DDDD. The skin laid back.
E. Patella.
F. Its ligament inserted into the tibia.
η. η. η. Inguinal glands.
ϛ. Syncondrosis of the bones of the pubis.
π. Margin or crest of the ileum.
I. Crural artery.
II. Crural vein.
I. Branch of the first lumbar nerve.
26. Twig of the second lumbar nerve, which divides into
27. One twig going to the back part of the thigh and of which Fig. 2. n. 28, 29, 30, 31. represents the ultimate branches.
39. Branch of the same nerve, which
40, 41.* Terminates by two filaments in the skin and fat of the mons veneris and in the scrotum.
42. A twig which terminates in the skin near the scrotum.
43. A very small branch going to an inguinal gland.
44. External cutaneous nerve.
46. Branch anastomosing with the crural nerve, (104.)
45. A very minute filament of this branch anastomosing with a branch of the iliac plexus, (105.)
47. Posterior branch of the external cutaneous nerve, (44.) going to the anterior and external part of the thigh, the progress of which branch, Fig. 2. n. 48, 49, 50, ,51 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, shows
69, 69. Anterior branch of the external cutaneous nerve, (44.) going to the anterior and external part of the thigh.
82. The anterior continuous branch of the external cutaneous nerve, (44.) which now divides into two equal twigs.
83. One which constitutes the fifth twig of the anterior branch of the external cutaneous nerve, and ends in

* It is presumed that Mr. Fischer means that these nerves go in the female to the Mons Veneris, and in the male subject to the corresponding part of the body and to the Scrotum.

84. A cutaneous branch terminated by two filaments, and in
85. A subcutaneous branch, which
86. Gives off a small nervous twig,
87, 88. Dividing into two filaments,
89. One by anastomosing joins with a small twig, and
91, 92. Ends by two filaments in the skin, covering the exterior of the knee. This ends
93. In another, which constitutes the sixth twig of the anterior branch of the external cutaneous nerve.
90, and 94. Another twig, which terminates in
99. The seventh twig of the anterior branch of the external cutaneous nerve (44.)
102. The root of the crural nerve, derived from the second and third lumbar nerves.
103. Root of the crural nerve, derived from the fourth lumbar nerve.
104. The nerve termed the crural, or great, or anterior femoral.
105, 105, 105. Nervous twigs arising from the crural nerve which form the delicate iliac plexus covering the iliacus internus muscle.
106. Recurrent nerve of the psoas magnus.
107. Nervous twigs distributed to the psoas muscle.
108. Musculo-cutaneous trunk arising from the crural nerve, which gives off various nerves, namely, the nerve for the pectineus muscle 109, three nerves for the sartorius muscle 113, 119, 195. Middle cutaneous nerve 124 gives four nerves to the vastus externus muscle 113, 146, 153, 165, and a short or superior nerve for the crural muscle.
109. Nerve for the pectineus muscle, the distribution of which in Fig. I. Tab. 4, n. 110, 111, can be seen.
113. Superior or short nerve for the sartorius muscle, the branches of which can be seen in Tab. III. Fig. 1, and Tab. IV. Fig. 1, 114, 115, 116, 117, 118.
119. Middle nerve for the sartorius muscle. The ultimate branches of this nerve can be distinctly seen in Tab. III. Fig. 1, and Tab. IV. Fig. 1, under the numbers of 120, 121, 122, 123.
124, 124. Middle cutaneous nerve.
137. Fourth small branch of the nerve 124, which anastomoses with the anterior cutaneous nerve 204.
138. Nervous branch, from which the nerves distributed to the vastus externus muscle, and the short or superior nerve of the crural muscle, arise. Tab. III. Fig. 1, represents in a partial manner the descent and distribution of these nerves, but Tab. IV. Fig. 1, represents perfectly these nerves, from the numbers 139, 140, to the number 180.
181. Branch arising from the crural nerve, which is distributed to the rectus muscle of the leg, the terminating branches of which appear partly from Tab. III. Fig. 1, partly from Tab. IV. Fig. 1, n. 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194.
201. Branch from which the nerve distributed to the crural artery, and to the short adductor muscle of Albinus, takes its origin.
202. Anastamosing twig arising from the preceding branch, to compose the anterior cutaneous nerve 204. Another anastamosing twig 203, represented in Tab. IV. Fig. 1, is also perceived.
204. Anterior cutaneous nerve.
205. First small branch of the nerve 204, which terminates by two twigs in the skin.
206. Anterior continued cutaneous nerve.
207. Second small branch of the nerve 204, which terminates
208. By two twigs in the skin.
208. Third small branch of the nerve 204, which
209, 210. Terminates by two filaments in the fat.
211. Continued anterior cutaneous nerve, 204.
213. Continued anterior cutaneous nerve 204.
218. Termination of the anterior cutaneous nerve.
219, 220. Disappearing by two twigs in the cellular texture uniting the superior margin of the patella with the skin.
221. Nervous branch going to the crural artery by two or three filaments, and terminating in its muscular coat.
222. Nerve which, proceeding to the short adductor muscle of Albinus, and there by anastamoses joins with the anterior branch of the obturator nerve, which enters the same muscle.
223. Long nerve of the crural muscle, the branches of which can be seen in Tab. IV. Fig. 1, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244. Beyond this nerve arises the short or superior nerve 245, which is delineated in the same table and figure under the numbers 246, 247, 248, 249, 250.
251. Root of the long or inferior nerve distri-

buted to the vastus internus muscle and saphenus nerve; the terminating branches of the former nerve are shown in Tab. IV. Fig. 1, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, but the descending of the posterior branch towards the knee is shown in the same table and figure under the numbers 266, 267, 268, 269, 270; but the terminating branches of this saphenus nerve, represented in our table, will be found in the following manner, viz. the

269. remarkable slip of the 1st branch of the saphenus nerve 266, which immediately divides into three or four small branches 270, 271, 272, 273, 274, 277, will be found Tab. IV. Fig. 1; the
271. Small branch of the branch 269, which terminates by one twig in cellular texture near the ligament of the patella, and by
275. Another which enters
276. The skin covering the anterior and external surface of the tibia in Tab. IV. Fig. 1.
274. Continued small branch, 271.
283. Remarkable continuation of the second branch of the saphenus nerve 266, which immediately terminates in three small branches 284, 291, and 294.
284. Small branch of the branch 283, which
285. Meets towards the knee by one twig and in its external side is inserted
286, 287. By two filaments into the capsular ligament.
297. Continuous saphenus nerve, Tab. IV. Fig. 1, 297.
298. Continuous saphenus nerve.
323. 11th branch of the saphenus nerve, which proceeds to the malleolus externus, and 12th branch of the saphenus nerve, going to the malleolus internus.
334. 14th branch of the saphenus nerve.
335. 15th branch of the saphenus nerve.
336. 16th branch of the saphenus nerve; which said three branches partly terminate below the malleolus internus in the adipose membrane of the skin, and partly in the skin itself.
337. 17th branch of the saphenus nerve, more singular than the rest, therefore it is customary to designate this branch by the name of the Lesser Saphenus Nerve, or Second. It proceeds along with the trunk of the saphenus nerve, with which, in its progress, it is joined in a threefold manner, by anastomosis, 302, 303, 318, towards the malleolus internus, and there terminates in the lateral and opposite part of the leg.
338. First small branch of this branch, almost the largest, passing over the tibia, and terminating in the skin, situated in the middle portion of the tibialis anticus muscle.
339. Small knot, or ganglion, which the lesser saphenus nerve forms to give of the various branches.
342. Filament given off to the skin during the progress.
346. A twig.
359. Continuous lesser saphenus nerve, 337.
390. Fifth branch of the internal cutaneous nerve.
394. Continuous small branch, 392.
397. Continuous 5th branch, 390.
398. Small branch distributed to the ligament of the patella.
399. Small branch which tends towards the exterior parts of the knee.
400. In the fat.
401. A slip of the inguinal nerve.
402. A branch obliquely ascending to an inguinal gland towards the superficial parts.
403. A small branch terminating in the fat.
404. Small branch descending to the inguinal gland.
405. Inguinal nerve continued.
406. Anastomosing branch which connects the anterior cutaneous nerve, 204, with ours.
407. Termination of this inguinal nerve in the fat.
408. Branch which terminates in three twigs.
409. 1st twig descends to the inguinal gland, during which course
410. It gives off a lateral filament to the fat,
411. And then enters the inguinal gland by two filaments.
412. Second twig proceeds to the inguinal gland.
413. The third twig is the external pudic nerve which bifurcating
414, 415. Proceeds by two filaments to the scrotum below the mons veneris,* and is distributed in a different manner to the skin and fat.
268. Internal branch of the superficial peroneal nerve meeting the view under the fascia lata.
289. External branch of the superficial peroneal nerve appearing under the fascia lata.

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* See previous note to 40. 41.

PL. XIV.

E. Mitchell sculp.

PLATE XIV.

This Plate represents those cutaneous and subcutaneous nerves and blood-vessels which meet the view above the fascia lata on the opposite side of the thigh when the common integuments and fat have been carefully removed, by reason of the extreme fineness of these nerves, the natural position and size of each cannot always be depicted, so as to satisfy the expectation of those most skilled in dissection. Since affairs are thus, we have the more studiously enlarged every nerve, so that in making this table, we may not overlook their natural situation. It therefore happens that more nerves should come into view when they have perforated the fascia lata. But we have abstained from the delineation of those cutaneous nerves on the sole of the foot, by reason of their extreme minuteness, and the small size of this table, in the same manner as in the preceding figure, we have left untouched the cutaneous nerves on the dorsum of the foot.

A. Gluteus magnus muscle.
B. Gluteus medius muscle.
C, C. Gastrocnemic muscles covered by the fascia lata.
D, D, D, D. A flap of skin.
ח. The margin or crest of the ilium.
ו. The os-pubis and its syncondrosis.
6. Small branch of the first lumbar nerve. For the origin of this nerve see Fig. 1, n. 1, 2, 3, 4, 5.
10. Continuous small branch, 6.
13. Another small branch of the same first lumbar nerve.
15. Continued small branch, 13.
17. Small branch continued, 13.
19. Continued small branch, 13, going towards the middle part of the gluteus maximus muscle.
22. Continued small branch, 13.
27. Small branch of the second lumbar nerve, see Fig. 1, n. 25, 26, 27.
28. Continued small branch, 27, now bifurcating.
47. Posterior branch of the external cutaneous nerve, 44.
50. *Continued small branch*, 48.
52. *Continued small branch*, 48.
53. *Continued small branch*, 48.
57. Continued branch, 47.
62. Branch continued, 47.
65. Continued branch, 47.
4. Superior lateral branch of the posterior cutaneous nerve, Tab. iv. Fig. 2, n. 1, 2, 3, shews the descent and junction of this nerve.
6. Small branch continued, 5.

10. Continued branch, 4.
14. Continued branch, 4.
18. Continued branch, 4.
24. Termination of the branch, 4.
27. Second lateral branch of the posterior superior cutaneous nerve, Tab. iv. Fig. 2, n. 25.
26, 27. Represents the origin and anastamosis of this nerve.
33. Branch continued, 27.
37. Continued branch, 27.
44. Third lateral branch of the posterior superior cutaneous nerve, perforating the fascia lata, Tab. iv. Fig. 2, under the numbers of 42, 43, 44, shows the origin and connexion of this nerve.
54. Continued nerve.
64. Fourth lateral branch of the posterior superior cutaneous nerve, penetrating the fascia lata. For the origin of this nerve, see Tab. iv. Fig. 2, n. 64.
66. Continued branch, 64.
68. Continued branch, 64.
70. Termination of branch, 64, bifurcating.
73, 73. Trunk of the posterior superior cutaneous nerve, perforating the fascia lata, Tab. iv. Fig. 2. n, 73, 73, represents the origin of this nerve.
77. Continued branch going to the external part of the ham.
85. Continued nerve, 73.
128. Internal superior cutaneous nerve, whose origin and connexion, Tab. iv. Fig. 2, shews 124, 125, 126, 127.
129. Continued nerve, 128.
132. Continued nerve, 128.
134. Termination of the internal superior cutaneous nerve in the skin, covering the internal part of the thigh.
136. Internal inferior cutaneous nerve, Tab. iv. Fig. 2. n, 136, represents its origin, it divides into three branches, namely, an internal, middle, and external.
137. Internal bifurcated branch of the nerve, 136.
140. Middle and thicker branch of the nerve, 136, descends on the back of the gastrocnemius internus muscle, and scatters different branches.
144. Continued branch, 140.
148. Continued branch, 140.
199. External cutaneous nerve, the origin of which may be seen in Tab. iv. Fig. 2.
203. Continued nerve, 199.
211. Continued nerve, 199.
217. Continued nerve, 199, which takes a very long course to the inferior part of the leg, and in this course distributes three twigs.
238. First posterior inferior external cutaneous nerve, or if another name of this nerve is better, it may be distinguished by the name of the external superior subsural cutaneous nerve, Tab. iii. Fig. 2, 238, best represents its origin, although it can be seen in Tab. iv. Fig. 2, 238.
244. Continued nerve, 238.
255. Continued nerve, 238.
466. First posterior inferior internal cutaneous nerve, or if it may be otherwise better named, it may be termed the internal superior subsural cutaneous nerve.
500. Posterior inferior external cutaneous nerve, or the inferior subsural external cutaneous nerve. Tab. iv. Fig. 2. 500, shows its origin.
504. Termination of the nerve, 500, in the skin.
506. Branch of the posterior second sacral nerve, going towards the gluteus maximus muscle.
516. Branch of the fourth posterior sacral nerve.
518. Continued branch, 516.
522. Branch of the posterior fifth sacral nerve, going towards the internal inferior part of the gluteus maximus muscle.

PL. XV.

E. Mitchell sculp.

PLATE XV.

This Figure represents the nerves of the right inferior extremity, and also some blood-vessels and the first layer of muscles, such as are situated immediately beneath the integuments and tendinous sheaths. But above all the descent of the crural or great femoral and the first distribution of its branches appears. Moreover, we have endeavoured to leave untouched in their natural situation those nervous branches distributed to muscles. We have represented the cutaneous nerves drawn aside or separated from each other to admit of a more accurate view of the other parts. But in making this engraving, we have attempted as much as is possible to observe and represent the natural form and nature of these nerves.

AA. Iliacus internus muscle.
B. Psoas magnus.
α. Its middle part.
β. Tendon to which the fleshy part of the iliacus internus is joined.
γ. Third head.
δ. Fourth head.
ξ. Fifth head.
ϑ. Psoas parvus.
ι. Its tendon.
κ. Quadratus lumborum muscle.
λ. Its origin from the crest of the ilium.
ς. Part of the glutæus medius muscle.
D, H. Sartorius muscle. D. Tendinous beginning arising from the crest of the ilium.
E, F, G. Tensor of the fascia lata, or sheath of the thigh. E. Arising from the crest of the ilium. G. The end where the tendinous portion is *laid back*.
I, L, M, N. Vastus externus muscle. I. Its tendinous portion. N. Insertion into the patella.
K, O, P, Q. Rectus muscle of the leg. O. Its tendon inserted into the patella. P. Place where it inserts *itself* into the patella. Q. Aponeurosis which runs from the tendon over the anterior part of the patella, and afterwards is connected to the first part of the ligament which passes from the patella to the tibia.
R, S, T. Ligament descending from the patella to the tibia. R. Place where it arises from the patella. T. In all this part inserted into the tibia.
U, V, W. Vastus internus muscle. V. Extreme tendon. W. Inserted into the patella.
X. Pectineus muscle or livid muscle.
Y. Long adductor of the thigh (Albinus.)
Z. Gracilis muscle.
AA. Great adductor of the thigh (Albinus.)
BB, CC, EE. Sartorius muscle. cc. Its tendon. ee. Inserted into the tibia.
DD. Semitendinosus muscle.

FF, GG, HH. Biceps cruris. GG. Extreme tendon. HH. Its principal portion inserted into the head of the fibula. GG. Part which belongs to the tibia.

II, KK, PP. Peroneus longus muscle. II. Arising from the head of the fibula. PP. Tendon arising from the exterior part of the muscular fibre.

LL. Soleus muscle.

MM, OO. Extensor longus digitorum pedis in union with the peroneus tertius muscle.

QQ. Peroneus brevis muscle.

TT, NN, RR, SS. Tibialis anticus muscle. N. Arising from the tibia. TT. Its tendon.

UU. Tendon of the extensor proprius pollicis.

VV. Branch of the tendon of the extensor proprius pollicis.

WW. Tendons of the extensor longus digitorum pedis.

XX. Extensor communis digitorum brevis muscle.

YY, ZZ. Gemelli or gastrocnemius muscle. YY. Its tendinous portion.

a, b, c. Soleus muscle. a. Arising from the tibia. c. Tendinous surface.

d. Flexor longus digitorum pedis, arising from the tibia.

e. Tendon of the plantar muscle.

f. Tendon of the tibialis posticus muscle.

I. Crural artery.

II. Crural Vein.

III. Circumflex artery of the ilium cut across.

IV. Arteria abdominalis of Haller.

V. External circumflex artery of the thigh.

ח. Margin or crest of the ilium.

ר. Os pubis and part of its syncondrosis.

1. Branch of the first lumbar nerve.

2. Branch springing from branch the first, going to the skin and muscles.

26. Branch of the second lumbar nerve.

44. External cutaneous nerve.

47. Posterior branch of the external cutaneous nerve, (44) going to the posterior part of the thigh.

71. Anterior branch of the external cutaneous nerve. Continued.

102. Root of the crural nerve, arising from the second and third lumbar nerves.

103. Root of the crural nerve, arising from the fourth lumbar nerve.

104. Nerve termed the crural, great femoral, or anterior.

105, 105, 105. Nervous twigs, arising from the crural nerve, forming that beautiful iliac plexus covering the iliacus internus muscle.

106. Recurrent nerve of the psoas muscle.

108. Musculo-cutaneous trunk arising from the crural nerve, which gives off various branches.

109. Nerve for the pectineus or livid muscle, the distribution of which can be seen in Tab. iv. Fig. 1, n. 110, 111.

112. Musculo-cutaneous trunk, 108, continued.

113. Superior or short nerve for the sartorius.

119. Middle nerve for the sartorius muscle.

124. Middle cutaneous nerve.

181. Nerve arising from the crural nerve going to the rectus muscle of the thigh.

200. Long nerve of the sartorius muscle descending from the internal side of this muscle, it becomes a very little lengthened towards the anterior parts. e. Termination inserted into the inferior part of the flesh.

201. Branch from which the nerve of the crural artery, and for the short adducter muscle of Albinus arise.

204. Anterior cutaneous nerve.

206. Anterior cutaneous nerve, 204, continued.

211. Continuation of the anterior cutaneous nerve.

213. Anterior cutaneous nerve, 204, continued.

218. Termination of the anterior cutaneous nerve.

251. Root of the long inferior nerve for the vastus internus muscle and of the saphenus nerve; for the terminating branches of the former see Tab. iv. Fig. 1. 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, the descent of the latter towards the knee can be seen in Tab. iv. Fig. 1. n. 266, 267, 268, 269, 270, and is also conspicuous in our table.

252, Long or inferior nerve for the vastus internus muscle.

266. Beginning of the saphenus nerve.

267. 1st Branch of the saphenus nerve.

282. 2d remarkable branch of the saphenus nerve.

298. Saphenus nerve continued.

299. 3d branch of the saphenus nerve.

301. *a*. 4th Branch of the saphenus nerve.

304. 5th Branch of the saphenus nerve.

308, 308. 6th Branch of the saphenus nerve, dividing directly into three small branches.

308. *a*. 7th Branch of the saphenus nerve which stops at the periosteum covering the tibia,

and seems to terminate there ; it is seen in Tab. ii. Fig. 1. n. 313.

314. 8th Branch of the saphenus nerve.

319. 9th Branch of the saphenus nerve.

320. *α.* 10th Branch of the saphenus nerve going to the malleolus externus.

323. 11th Branch of the saphenus nerve going towards the malleolus externus.

326. 12th Branch of the saphenus nerve going to the malleolus internus and divides into three small branches.

331. 13th Branch of the saphenus nerve ; for its distribution, see Tab. 11, Fig. 1. n. 332, 333.

334. 14th Branch of the saphenus nerve.

335. 15th Branch of the saphenus nerve.

336. 16th Branch of the saphenus nerve. These three branches partly terminate in the adipose membrane of the skin below the malleolus internus, or in the skin itself.

337. 17th Branch of the saphenus nerve more singular than the others, for this reason we have termed this nerve—in the preceding table the second or lesser saphenus nerve—it wanders with the accompanying trunk of the saphenus nerve with which in its course it is connected in a threefold manner, 302, 303, 318, towards the *malleolus internus*, and there it terminates in the lateral and opposite part of the leg.

339. Small knot or *ganglion* which the lesser saphenus nerve forms to give off various branches.

359. Lesser saphenus nerve, 337, continued.

363. Root of the internal cutaneous nerve.

364. Internal cutaneous nerve

365. 1st Branch of the internal cutaneous nerve.

366. 1st Branch of the internal cutaneous nerve continued, which is to be accounted as the second branch.

378. 1st Branch of the internal cutaneous nerve continued.

379. 3d Branch of the internal cutaneous nerve, which is distributed to the gracilis muscle and there terminates—our readers may desire to see this nerve in Tab. 1. Fig. 1. but in its stead they will find another going to the *fascia lata*—but we have observed that sometimes one, and sometimes the other, and sometimes both are found in bodies.

388. 4th Branch of the internal cutaneous nerve increasing the 1st branch which has been given off before it, and now is collected into the internal cutaneous nerve itself.

390. 5th Branch of the internal cutaneous nerve perforating near the tendon of the sartorius muscle.

397. 5th Branch, 390, continued.

268. Internal dorsal branch of the superficial peroneal nerve.

270. Branch 268 continued, gives off various branches.

289. External dorsal branch of the superficial Peroneal nerve.

294. External dorsal branch of the superficial peroneal nerve, 289 continued.

296. Branch 294 continued, which is now distinguished by the name of the metatarsal nerve.

408. Continued communicating branch of the tibial nerve.

PL. XVI.

F. Mitchell sculp.

PLATE XVI. FIG. I.

This engraving represents the opposite part of the same right inferior extremity, together with some nerves, blood-vessels, and the first layer of muscles, those which, with the exception of the extremity of the foot, meet the eye, when the skin and tendinous sheaths have been laid back. Therefore our readers will find the subcutaneous small branches of the sciatic nerve, and will take into consideration, that in order to represent the other things more accurately, we have been obliged to remove some of these nervous branches from their position. We wish the same thing said of the origin of the nervus communicans peronæus et tibialis.

A, B, B. Gluteus maximus muscle. B, B. that part which arises from the crest of the ileum and os sacrum, it joins in this place with the *latissimus dorsi.*

C, D, E. Gluteus medius muscle. D. arising from the os ileum. E its tendon.

F. Tensor muscle of the fascia lata of the thigh.

G, H. Vastus externus muscle. G. its tendinous surface.

I, K, L, M, N, O. Biceps cruris muscle. I, its long head. N, L. its short head. K, M, O, its tendon. K, origin from the surface of the long fleshy head, then increasing in size from the junction of the short head. M, O. in this last part it is inserted into the head of the fibula.

P. Part of the poplitæus muscle.

Q, R. Semitendinosus muscle. R. its tendon.

S, T, V, W. Semimembranosus muscle. W. origin of its tendon from the fleshy part.

T. The tendon itself.

U. Adductor magnus femoris muscle of Albinus, or triceps femoris.

X, Y. Gracilis muscle. Y, its tendon.

Z. Sartorius muscle.

a, a, b, c. Gemelli or Gastrocnemii muscles.

b. Origin of the tendon. c, its termination or insertion in the *calcaneum*, which part is with propriety termed the tendo Achillis.

d, g, h. Soleus muscle, h, its tendinous surface.

e. Tendon of the plantar muscle.

f, i, k. Beginning of the peronæus longus muscle.

k. Its tendon.

l. Peronæus brevis muscle.

m. Flexor pollicis longus muscle.

I. Poplitæal artery.

ח. Margin or crest of the ileum.

ך. Syncondrosis of the bones of the *pubis.*

6. Small branch of the first lumbar nerve—for its origin see plate xv. n. 1. 2.

10. Small branch 6. continued.

13. Another small branch of the first lumbar nerve.

15. Small branch 13 continued.

17. Small branch 13 continued.

19. Small branch 13 continued. It now proceeds to the middle part of the gluteus maximus muscle.

27. Small branch of second lumbar nerve.

28. Small branch 27 continued, it now divides.

47. Posterior branch of the external cutaneous nerve, 44.

57. Branch 47 continued.

59. Branch 47 continued.

62. Branch 47 continued.

65. Branch 47 continued.

4. 1st Lateral branch of the posterior superior cutaneous nerve, for its descent and connexion see plate xviii. n. 1. 2.

5. A small branch which bends upwards, proceeding to the scrotum in the male, but in the female reaches the posterior part of the greater labia.
6. Branch 5 continued.
14. Branch 4 continued.
18. Branch 4 continued.
24. Termination of branch 4.
33. Second lateral branch of the posterior superior cutaneous nerve.
37. Branch 33 continued. For the further progress of this nerve see plate xiv. under the numbers of 26, 27, 33, 37.
44. Third lateral branch of the posterior superior cutaneous nerve. For the origin and connexion of this nerve, see Plate xviii. n. 42, 44, 46.
46. Branch 44 continued.
54. Nerve 44 continued, is divided in this place.
64. Fourth lateral branch of the posterior superior cutaneous nerve. For its origin see Plate xviii. n. 64.
68. Branch 64 continued. Plate xiv. n. 70, shows the termination of this nerve.
73. Trunk of the posterior superior cutaneous nerve. The origin of this nerve is seen in Plate xviii. n. 73, 73.
77. Nerve 73 continued, going to the external part of the ham.
85. Nerve 73 continued. Plate xiv. n. 85, shows its termination.
128. Internal superior cutaneous nerve. Plate xviii. n. 124, 128, 129, shows its origin and connexion.
129. Nerve 128 continued.
132. Nerve 128 continued.
134. Termination of the internal superior cutaneous nerve in the skin, covering the internal part of the thigh.
136. Internal inferior cutaneous nerve. Plate xviii. n. 136, represents its origin; it is divided into three branches, an internal, a middle, and external.
137. Branch of nerve 136; on the inside it bifurcates and terminates in the skin. See Plate xiv. n. 137.
140. Middle and thicker branch of nerve 136 descends on the back of the internal *Gastrocnemius* muscle, and
141. Divides into an external small branch which ends by two twigs.
144. Branch 140 continued.
148. Branch 140 continued.
199. External cutaneous nerve, the origin of which can be seen in Plate xviii. n. 199.
203. Nerve 199 continued.
211. Nerve 199 continued.
235. Communicating nerve of the peroneal and posterior inferior cutaneous nerve slightly laid back.
238. First external posterior inferior cutaneous, or cutaneous sural nerve.
244. Nerve 238 continued; the external small branch of the nerve with two of its twigs, we have delineated in Plate xiv.
387, 387. Tibialis communicans nerve.
391. Nerve 387 continued.
392. Nerve 387 continued.
396. Nerve 387 continued.
397. Supra-malleolar nerve.
408. Tibialis communicans nerve continued.
466. First internal posterior inferior cutaneous nerve, or internal superior subsural cutaneous nerve. Its origin is seen in Plate xviii. n. 466, its branches are seen in Plate xiv. n. 466.
469. Termination of cutaneous nerve 466.
493. Second internal posterior inferior cutaneous nerve, or internal subsural cutaneous nerve. For its origin see Plate xviii. n. 493, it divides into two small branches.
197, 197. Tibialis or tibieus nerve.
198. Peroneal nerve.
260. Superficial branch of peroneal nerve cut off.
425. Trunk of the nerve for the soleus, the poplitæal and gastrocnemii muscles.
426. Nerve going by two filaments to the soleus muscle.
436 Nerve descending to the right head of the gastrocnemius muscle.
439. Nerve of the poplitæus muscle and interosseal ligament connecting the tibia and fibula.
446. Nerve of the soleus muscle and flexor longus pollicis pedis.
267. First branch of the saphenus nerve seen on the back.
297. Saphenus nerve seen on the back continued.
506. Branch of the second posterior sacral nerve.
511. Branch of the third posterior sacral nerve.
516. Branch of the fourth posterior sacral nerve.
518. Branch 516 continued.
522. Branch of the posterior fifth sacral nerve going to the inferior and internal part of the gluteus maximus muscle.
523. Superior bifurcating branch of the branch 522, it divides into two twigs.

Figure II.

Since by reason of the situation of this right inferior extremity (which a little before we have delineated on the same plate) the rules of drawing have embarrassed us; since we have depicted the extremity of the foot less, in order that the parts situated on its sole should be more distinctly seen; for the better and more convenient view of these things, nor forgetful of these rules of the art, we have attempted to represent the foot free from the leg, and therefore, of course, cut off. By this means, this engraving of the sole of the foot, stripped of the common integuments, affords a view of the *plantar aponeurosis*, and of some superficial nerves, blood-vessels, and first layer of muscles.

a, b, c, d, e, f, g, h. Middle of the plantar aponeurosis joined on one side with the aponeurosis covering the abductor muscle of the little toe, on the other side with that covering the abductor muscle of the great toe. a. Origin from the tuberosity of the calcaneum d, e, f, g, h; five portions belonging to the toes.

i, k, l, m, n. Aponeurosis covering the abductor muscle of the little toe. k. Its origin from the tuberosity of the calcaneum. i. Part which is inserted into the first head of the metatarsal bone of the little toe. m. Portion which is joined with the middle plantar aponeurosis. n. Part which is given to the origins of the flexor parvus minimi digiti and of the interosseal muscle of the toe of the same foot.

o, p. Aponeurosis covering the abductor muscle of the great toe. p. Its origin from the calcaneum.

α. Os calcis or *calcaneum*.

10. Small branch of the internal branch 14 of the internal plantar nerve 6. See Plate xviii. n. 14, 6.

11. Its first twig ends in the fat. Its second goes to the skin.

13. Its third goes to the internal side of the foot and there terminates.

13. α. Fourth twig of the small branch 10 ends in the fat.

64. Middle branch, otherwise called external or superficial, descends on the side of the external plantar nerve of the 5th toe, and gives off.

65. A small branch to the little toe. It is termed the plantar nerve, or rather the external digital nerve of the little toe. For the origin and connexion of all these plantar or digital nerves, see Plate xviii.

66. Another small branch of the middle branch 64, which goes, on the external side of the fifth toe, towards the back of the foot, and is called the dorsal small branch.

67. External branch of the external plantar nerve.

68. Small branch of this nerve going to the abductor muscle of the little toe.

69. Small branch of branch 67, going to the short flexor and interosseal muscle of the little toe.

PL. XVII.

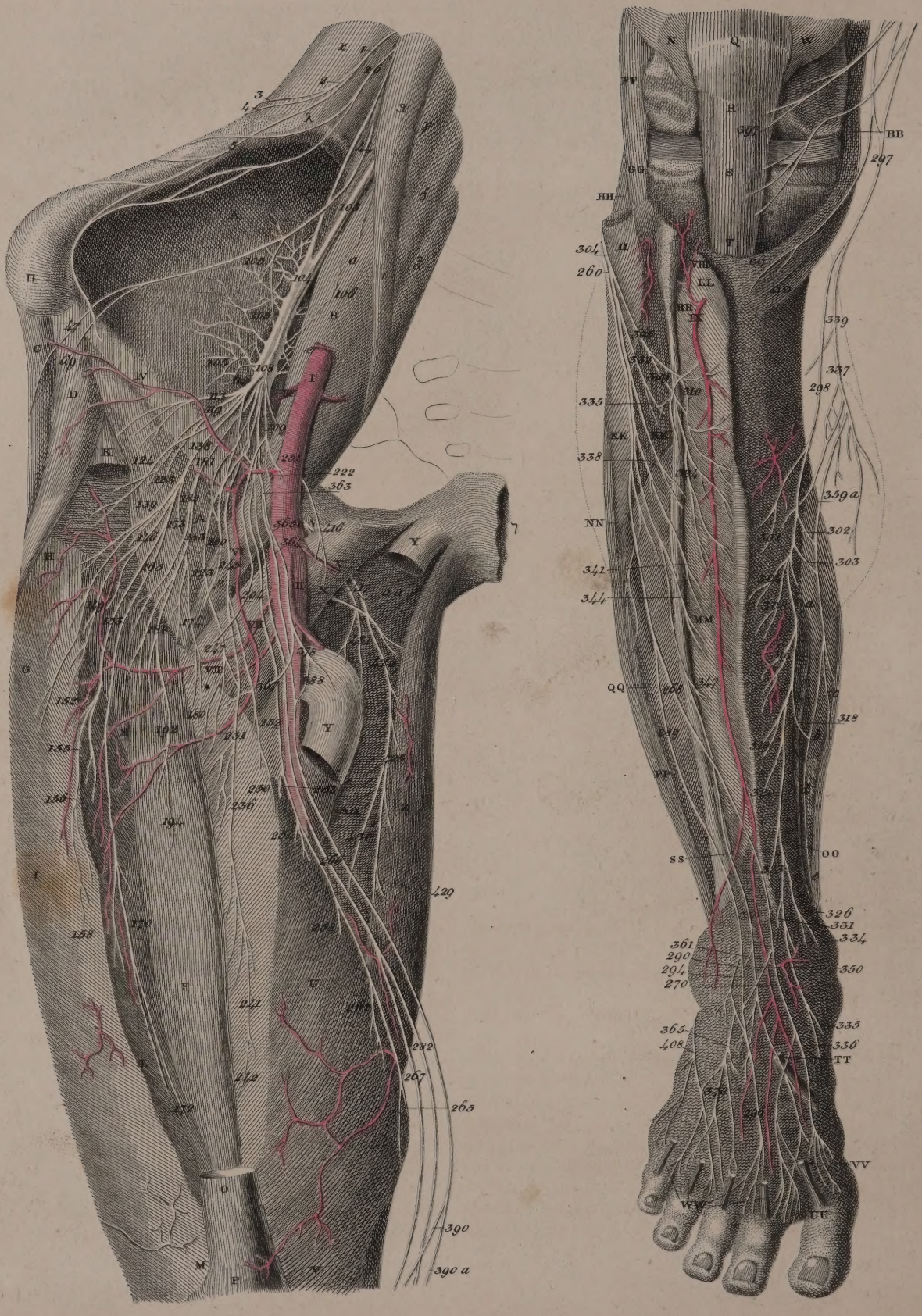

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PLATE XVII.

Having cut through the following muscles, viz. the tensor vaginæ femoris, the sartorius, rectus cruris, gastrocnemii, tibialis anticus, extensor longus digitorum pedis, the tendon of the extensor proprius pollicis being removed, the ligamentous parts, and the cutaneous and subcutaneous nerves and vessels laid back; this plate shows, in their natural situation anteriorly, the second and third layer of nerves, vessels, and muscles, and also the principal branches of the obturator or lesser femoral nerve, as far as the small space and minuteness of the figures will permit.

A, A. Iliacus internus muscle.
B. Psoas magnus muscle.
α. Its middle part.
β. Its tendon to which the fleshy fibres of the iliacus internus are attached.
γ. Its third head.
δ. Fourth head.
ξ. Fifth head.
ϑ. ι. Psoas parvus muscle.
ι. Its tendon.
κ. Quadratus lumborum muscle cut off.
λ. Its origin from the crest of ileum.
C. Anterior and lateral part of the gluteus medius muscle.
D. Greatest portion of the gluteus minimus muscle.
E, F. Cruralis or crureus muscle. F. Its tendon.
G, H, I, L, M, N. Vastus externus muscle. G. Beginning of its tendinous portion. H. Arising from the os femoris. I. Tendinous portion. L. Its tendon. M. Extremity of its tendinous part. N. Insertion into the patella.
K. Origin of the rectus cruris muscle cut off.
O, P, Q. Tendon of the rectus cruris inserted into the patella. P. Place where it inserts itself into the patella. Q. Aponeurosis which runs from the tendon of this muscle, first over the anterior surface of the patella, and then is connected to the superior part of the ligament which attaches the patella to the tibia.
R, S, T. Ligament descending from the patella to the tibia. R. Place where it arises from the patella. T. In all this part inserted into the tibia.
U, V, W. Vastus internus muscle. V. Its tendon. W. Inserted into the patella. * arising from the os femoris.
X. Pectineus muscle.
Y, Y. Adductor longus muscle cut through that the principal branches of the obturator nerve may be more distinctly seen. Y. Origin cut off arising from the ligament, by which the bones of the pubis are connected.
Z. Gracilis muscle.
AA, aa. Adductor magnus femoris. aa. Its origin from the bones of the pubis.
BB, CC. Tendon of the gracilis muscle. CC. Inserted into the tibia.
DD. Tendon of the semitendinosus muscle inserted into the tibia.

FF, GG, HH. Biceps cruris muscle. GG, HH, its extreme tendon. HH. the principal part inserted into the head of the fibula. GG, part attached to the tibia.

II, KK, PP. Peroneus longus muscle. II, arising from the head of the fibula. PP. tendon arising from the external muscular fibres.

NN, QQ. Peroneus brevis muscle, upon which the traces of the extensor longus digitorum pedis, which has been removed are impressed.

LL, MM, RR, OO. Tibialis posticus muscle. LL. its origin from the tibia. RR. origin from the spine of the fibula. OO. its tendon.

SS. Flexor longus pollicis pedis muscle.

TT. Tendon of the tibialis anticus muscle cut short.

UU. Tendon of the extensor proprius pollicis muscle cut through.

VV. Branch of the same tendon cut through.

WW. Tendons of the extensor longus digitorum pedis cut short.

XX. Extensor brevis digitorum communis pedis.

a, b, c. Soleus muscle. a. arising from the tibia. c. its tendinous surface.

d. Flexor longus digitorum pedis muscle, arising from the tibia.

e. Tendon of the plantar muscle.

I. Crural artery.

II. Deep femoral artery.

III. Circumflex artery of the ileum cut short.

IV. Abdominal artery of *Haller*.

V. Internal circumflex artery of the thigh.

VI. External circumflex artery of the thigh.

VII. Two branches of the deep femoral artery.

VIII. Recurrens tibialis artery.

IX. Anterior tibial artery.

ה. Margin, or crest of the ileum.

ך. Synchondrosis of the bones of the pubis.

י. Obturator foramen.

1. Branch of the first lumbar nerve.

2. Branch arising from branch 1. and dividing into

3, 4. Two nerves going to the skin and muscles.

5. Branch 1. continued.

26. Branch of the 2d lumbar nerve.

44. External cutaneous nerve.

47. Posterior branch of the external cutaneous nerve 44, descending towards the posterior and lateral part of the thigh, its distribution is seen in Plate xiv. n. 48, 50, 52, 53, 65.

69. Anterior branch of the external cutaneous nerve 44, going to the posterior and lateral part of the thigh, its progress is shewn in Plate xiii. n. 46, 45, 47, 69, 82, 83, 84, 85, 86, 87, 88, 90, 91, 92, 93, 94, 99.

102. Root of the crural nerve, arising from the 2d and 3d lumbar nerves.

103. Root of the crural nerve, arising from the 4th lumbar nerve.

104. Crural, or great femoral, or anterior nerve.

105, 105, 105. Nervous branches arising from the crural nerve forming the beautiful iliac plexus which covers the iliacus internus muscle.

106. Recurrent nerve of the psoas muscle.

108. Trunk of the musculo cutaneous, arising from the crural nerve.

109. Branch to the pectineus or lividus muscle.

112. 108 continued.

113. Superior or short nerve for the sartorius muscle.

119. Middle nerve for the sartorius muscle.

123. Branch of nerve 119.

124. Middle cutaneous nerve.

138. Branch from which the nerves for the vastus externus and short nerve, or superior of the cruralis muscle take their origin.

139. Superior, short, or first nerve for the vastus externus muscle, distributed to it by five or six branches.

146. Middle or second nerve of the vastus externus muscle.

149. Nerve 146 continued.

152. Termination of the middle nerve for the vastus externus muscle.

153. Third or inferior nerve of the vastus externus muscle.

155. Nerve 153 continued.

156. 155 continued.

158. Termination of the 3d or inferior nerve of the vastus externus muscle.

165. Fourth, or long, or inferior nerve of the vastus externus muscle, it takes a long course among the rest of the nerves of the vastus externus muscle, and almost reaches the knee.

170. Nerve 165 continued.

172. Termination of nerve 165. All the nerves of the vastus externus muscle with their branches, are removed a little from their natural situation, in order that they may be more accurately viewed.

173. Superior, or short nerve, for the cruralis or crureus muscle.
174. 173 continued.
180. Termination of nerve 173.
181. Nerve arising from the crural nerve going to the rectus cruris muscle.
182. Its external branch bifurcates.
183. Its internal branch gives off numerous small branches.
188. Branch 183 continued.
192. 183 continued.
194. Termination of branch 183.
200. Longer, or inferior nerve of the sartorius muscle, descending on its internal side, and cut short; but its further progress can be seen in Plate XV. n. 200.
204. Anterior cutaneous nerve. See its distribution in Plate XIII. n. 205, 206, 207, 208, 209, 210, 211, 213, 218, 219, 220, and also in Plate XV. n. 204, 206, 211, 213, 218.
222. Nerve going to the short adductor muscle of Albinus, and there anastomosis with the anterior branch of the obturator going to the same muscle.
223. Long or inferior nerve for the cruralis or crureus muscle; it descends in the middle of the thigh towards the knee.
231. 223 continued.
236. 223 continued.
241. 223 continued.
242. Termination of the nerve 223.
245. Superior or short nerve of the vastus internus muscle, near to the preceding nerve 223; it arises separately from the crural nerve, and is distributed to the superior part of the same muscle.
247. 245 continued.
248. Branch of nerve 245.
250. Termination of 245.
251. Root of the long or inferior nerve of the vastus internus muscle, and of the saphenus nerve.
252. Long or inferior nerve of the vastus internus muscle.
253. First branch of nerve 252.
254. Second do. do.
258. Third do. do.
261. Fourth branch of nerve 252; it divides into three small branches.
265. Termination of nerve 252 on the internal part of the thigh.
266. Beginning of the saphenus nerve, or rather the saphenus nerve itself.
267. First branch of the saphenus nerve.
282. Second remarkable branch of the nerve 266.
297. Saphenus nerve continued.
298. Saphenus nerve continued.
301. Fourth branch of the saphenus nerve 266.
302, 303. Two anastomosing branches which join the saphenus nerve, with its remarkable branch 337.
304. Fifth branch of the saphenus nerve.
308. Sixth branch of the saphenus nerve.
314. Eighth branch of the saphenus nerve.
318. Anastomosing branch which unites the saphenus nerve 266 with its remarkable branch 337.
319. Ninth branch of the saphenus nerve, which goes by two twigs to the periosteum covering the tibia.
320. Tenth branch of the saphenus nerve 266, proceeding towards the malleolus externus.
323. Eleventh branch of the saphenus nerve 266, which goes towards the malleolus externus, and ends in the fat.
326. Twelfth branch of the saphenus nerve.
331. Thirteenth branch of the saphenus nerve.
334. Fourteenth branch of the saphenus nerve.
335. Fifteenth branch of the saphenus nerve.
336. Sixteenth branch of the saphenus nerve.
337. Seventeenth branch of the saphenus nerve 266, more remarkable than the others; therefore we call this the second or lesser saphenus nerve. It passes along with the trunk of the saphenus nerve, and in its course is connected with it by anastomosis in a threefold manner, n. 302, 303, 318, going to the malleolus internus, and terminating in the lateral and opposite part of the leg.
339. Small knot or ganglion which the lesser saphenus nerve forms, for the purpose of giving off various branches.
359. a. Nerve 337 continued.
363. Root of the internal cutaneous nerve.
364. Internal cutaneous nerve.
365 a. First branch of the internal cutaneous nerve.
367. First branch continued, 365 a.
378. First branch continued.
388. Fourth branch of the internal cutaneous nerve, a small branch of the first branch 365 a. and has the same termination; it anatomosis with the internal cutaneous nerve itself.

390. Fifth branch of the internal cutaneous nerve perforating the sartorious muscle near its tendon.
390 a. Internal cutaneous nerve continued distributing itself to the saphenus nerve.
416. Egress of the obturator nerve from the *foramen ovale.*
417. Anterior branch of the obturator nerve going to the gracilis muscle.
420. Anterior branch of the obturator nerve continued.
425. Anterior branch of the obturator nerve continued.
430. Anastomosing branch of the anterior branch 417, which connects this nerve with the saphenus 266.
431. Branch of the obturator nerve going to the long adductor muscle of the thigh.
260. Superficial peroneal nerve.
268. Internal dorsal branch of the superficial peroneal nerve.
270. Branch 268 continued, giving off various small branches.
289. External dorsal branch of the superficial peroneal nerve 260.
294. External dorsal branch of the superficial peroneal nerve 289 continued.
296. Branch 294 continued, which is now called the internal metatarsal nerve.
304. Deep peroneal nerve.
305. Branch of the deep peroneal nerve descends deeply between the tibialis anticus, and peroneus longus muscles, and terminates by a number of branches and twigs in the tibialis anticus muscle.
309. Branch 305 continued.
310. Anastomosing branch.
324. 305 Continued, terminating in two small branches.
332. Branch of the deep peroneal nerve 304, which bifurcates.
335. Branch of the deep peroneal nerve 304, which goes to the extensor longus digitorum, and extensor proprius pollicis muscles.
338. Branch of the deep peroneal nerve 304, which proceeds partly to the tibialis anticus, extensor communis digitorum, and extensor proprius pollicis muscles.
341. Branch 338 continued, which dips into the tibialis anticus muscle.
344. Branch of the deep peroneal nerve 304, proceeding by two small branches to the tibialis anticus muscle.
347. Branch of the deep peroneal nerve 304.
350. Branch of the deep peroneal nerve 304, called the internal dorsal, or superficial nerve.
361. Branch of the deep peroneal nerve 304, also termed the external dorsal or deep, it runs beneath the extensor digitorum brevis muscle towards the extremity of the foot.
365. External metatarsal branch 290 continued.
370. 290 Continued.
408. Communicating branch of the tibial nerve continued.

PL. XVIII.

Fig. 1.

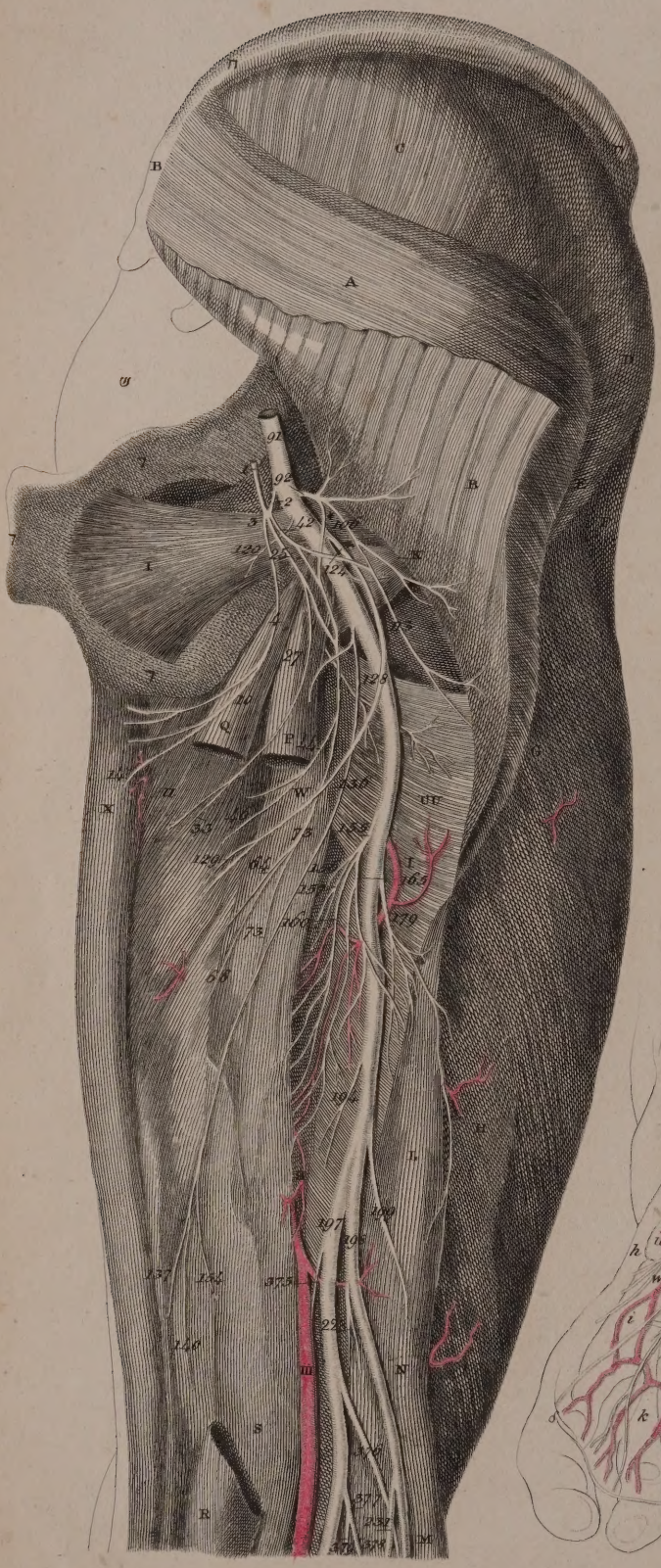
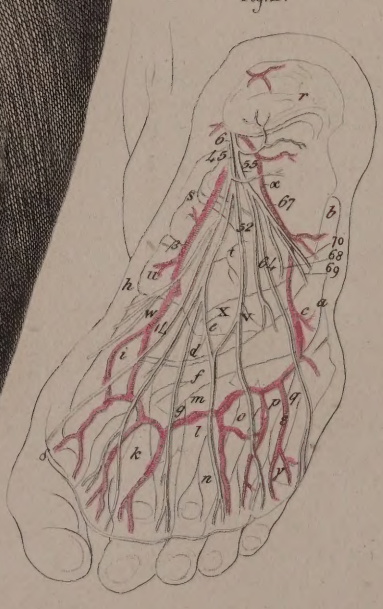


Fig. 2.



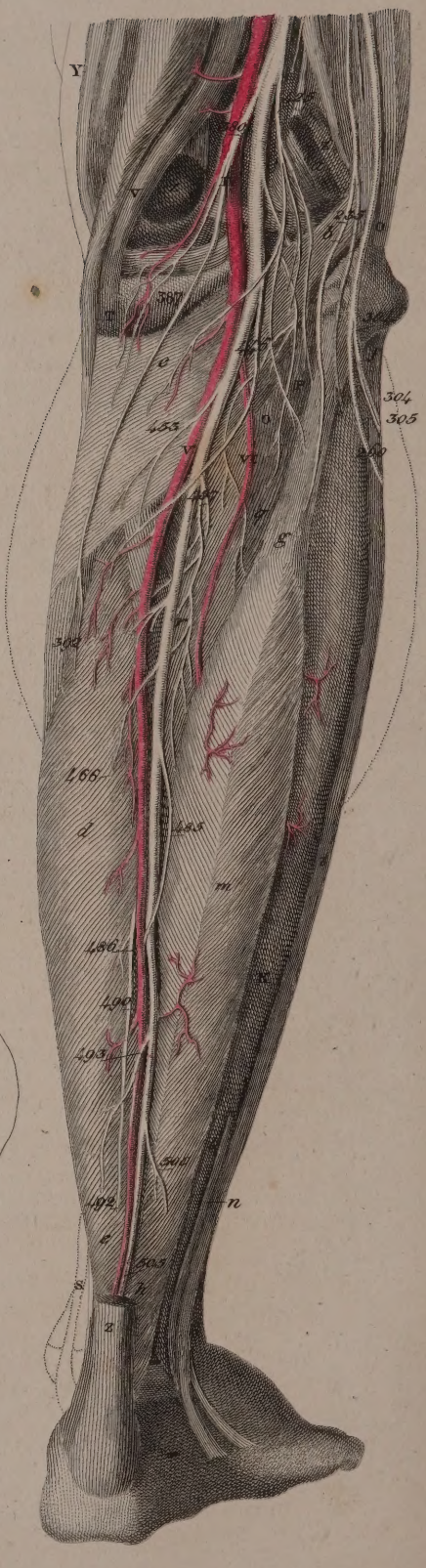


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PLATE XVIII

Fig. 1.

This Engraving gives a view of the posterior surface of the same right inferior extremity, the following muscles having been cut off or laid aside, viz. the Pyriformis, the superior and inferior Gemellus, Quadratus femoris, Biceps flexor cruris in part, Plantaris, Semitendinosus, Sartorius, Soleus, &c., the aponeurotic and ligamentous parts have been removed, together with the cutaneous and subcutaneous vessels and nerves; it also represents the second and third layer of muscles, the second and third series of vessels and nerves, and especially the descent of the Sciatic or Posterior femoral nerve along the thigh. But in this figure, by reason of the circumstances mentioned before, the situation and form of the nerves represented in these parts, cannot be strictly observed.

A, B, B. Glutæus maximus muscle removed from its superior attachment and completely turned back, that the sciatic nerves in their descent from the pelvis, and the origin and distribution of the Glutæal nerves may be more distinctly seen.

C, D, E. Glutæus medius muscle. D. Origin from the ileum. E. Its tendon.

F. Tensor muscle of the sheath of the thigh.

G, H. Vastus externus muscle. G. Its tendinous surface.

I.* Obturator internus. *Tendon by which it is inserted.

K. Obturator externus muscle.

L, M, N, O. Short head of the biceps muscle. M, O. Its tendon at this extreme part inserted into the head of the fibula.

P. Long head of the biceps cruris muscle laid back.

Q, R. Semitendinosus cut off. Q. Its head laid back. R. Its tendon cut off.

S, T, V, W. Semimembranosus muscle. W. Origin from the back of the tuberosity of the ischium. S. Its fleshy belly. V. Posterior aponeurosis which is inserted below the root of the head of the tibia. T. Anterior aponeurosis which is implanted into the internal margin of the tibia.

u, uu. Adductor magnus femoris muscle. u. Part arising from the os pubis. uu. Extremity attached superiorly to the os femoris.

X, Y. Gracilis muscle. Y. Its tendon.

Z, Z, z. External and internal heads of the Gemellus muscle of the leg. z. Tendo Achillis.

a. Plantar muscle cut through.
b, c. Popliteus muscle. c. Its tendinous portion. b. Its tendon.
d, e. Flexor longus digitorum pedis muscle. e. Its tendon.
f, i, k. Peroneus longus muscle. f. Its origin from the fibula. i. Tendon arising from the flesh and inserted into the extremity of the foot.
g, h, m. Flexor longus pollicis pedis muscle. g. Its origin from the tibia. m. Its fleshy belly. h. Tendon proceeding to the great toe.
l, n. Peroneus brevis muscle. n. Part of the tendon arising from the flesh.
o, p, q, r, s. Tibialis posticus muscle. o. Part which arises from the tibia. p. Part arising from the fibula. q. Tendinous surface. s. Its tendon.
I. 1st Perforating artery of the thigh.
II. 2d Do. do.
III. Crural artery.
IV. Poplitœal artery.
V. Posterior tibial artery.
VI. Peroneal artery.
ח. Crest of the ileum.
ך. Syncondrosis of the bones of the pubis.
ך. Internal surface of the bones of the pubis.
ש. Superior part of the ileo-sacral notch.
1. Posterior Superior cutaneous nerve, coming out separately from the pelvis, near to the schiatic nerve.
2. Nerve arising from the sciatic nerve increasing the posterior and superior cutaneous nerve 1.
4. First lateral branch of the posterior superior cutaneous nerve.
10. Branch 4 continued.
14. Branch 4 continued. Plates xiv. and xvi. shew its further distribution, n. 5, 6, 10, 14, 18, 24, 26, 27.
25. Commencement of the second lateral branch of the posterior superior cutaneous nerve.
27. Second lateral branch of the posterior superior cutaneous nerve continued.
33. Do. do. do.
42. Superior posterior cutaneous nerve continued.
44. Third lateral branch of the posterior superior cutaneous nerve.
46. Branch 44 continued. See its distribution in plates xiv. and xvi. n. 47, 48, 50, 52, 53, 57, 59, 62, 65.
64. Fourth lateral branch of the posterior superior cutaneous nerve.
66. Branch 64 continued. Plate xiv. n. 68, 70, shows its ultimate distribution.
73, 73. Trunk of the posterior superior cutaneous nerve continued.
91. Sciatic or posterior femoral nerve coming out of the cavity of the pelvis.
92. Branch of the sciatic nerve, distributed to the glutæus maximus by various twigs and filaments.
106. Branch 92 continued.
113. Do. do.
120. Branch to the superior and inferior geminus muscles laid back and cut through.
124. Origin of the internal superior cutaneous nerve.
128. Internal superior cutaneous nerve.
129. Nerve 128 continued.
136. Internal inferior cutaneous nerve is divided into three branches, an internal, a middle, and an external.
137. Internal branch of nerve 136, bifurcates and terminates in the skin.
140. Middle and thicker branch of nerve 136, descends on the back of the gastrocnemius internus muscle, and scatters various branches which can be seen in plate xiv. n. 144, 148.
154. External branch of nerve 136 quickly terminates in the skin.
156. Branch of trunk 155 going to the triceps muscle.
157. Branch of the trunk 155.
160. Branch of trunk 155 going to the semimembranosus muscle.
165. Branch of the trunk from which arise the nerves going to the semimembranosus, semitendinosus, and to the long and short heads of the biceps cruris muscle.
179. Branch arising from the sciatic nerve, goes to the short head of the biceps muscle and terminates by various filaments.
194. Branch distributed to the long head of the biceps muscle.
197. Tibial nerve.
198. Peroneal nerve.
199. External cutaneous nerve. Its progress un-

der the skin is seen in plate xiv. n. 203, 211, 217.

228. Branch arising from the peroneal nerve goes to the short head of the biceps muscle.

231. Common trunk of the communicating peroneal branch and posterior inferior cutaneous nerve.

235. Trunk of the same nerve continued, its further course is seen in plate xiv. n. 238, 244, 255, and in plate xvi. n. 238.

260. Superficial peroneal nerve, the progress of this nerve towards the anterior part of the thigh, is seen in plate xvii. n. 268, 270, 289, 290, 294, 296.

304, 304, 305. Deep peroneal nerve, its distribution to the anterior part of the leg is seen in plate xvii. n. 305, 309, 310, 324, 332, 335, 338, 341, 344, 347, 350, 361, 365, 370.

375. Nerve going to the soleus muscle.

376. Nerve going to the short head of the biceps cruris.

377. Common nerve for the gastrocnemius and plantar muscles.

378. Branch of the nerve 377, going to the right head of the gastrocnemius muscle.

379. The branch 377 going to the plantar muscle.

380. The nerve from which the branch distributed to the left head of the gastrocnemius, and soleus muscles arises, and also the communicating tibial nerve.

387. Communicating tibial nerve.

392. Communicating tibial nerve continued, its distribution is seen in Plate xvi. n. 391, 392, 396, 397, 408, and in Plate xvii. n. 408.

425. Common nerve of the soleus, gastrocnemius, and poplitœus muscles.

446. Common or proper branch for the soleus, and flexor longus pollicis muscles.

453. Branch distributed to the body of the soleus muscle: it bifurcates.

457. Common branch of the nerve for the tibialis posticus, flexor longus digitorum pedis, flexor longus pollicis pedis muscles, and also of the superior inferior internal cutaneous nerve.

466. Posterior inferior cutaneous nerve itself; the distribution of this nerve is seen in Plate xiv. n. 466.

485. Branch distributed to the tibialis posticus muscle, and terminating by a few twigs in its fleshy substance.

486. Branch distributed to the flexor longus digitorum pedis muscle.

490. Branch 486 continued.

492. Termination of branch 486.

493. Second posterior inferior internal cutaneous nerve, or internal inferior subsural cutaneous nerve, it divides into two small branches.

500. Second posterior inferior external cutaneous nerve, or inferior external subsural cutaneous nerve.

502. Posterior inferior cutaneous nerve continued; see its distribution in Plate xiv. n. 503, 504.

505. Termination of the tibial nerve.

Figure. II.

Actuated by the same reasons which induced us to represent the sole of the foot by itself in Plate XVI. Figure II. we have attempted here also to give a view of it detached from the leg. This figure, therefore, of the sole of the same right foot, represents the second and third layer of vessels and nerves. These parts being cut through, viz. the plantar aponeurosis, the abductor minimi digiti, abductor pollicis, flexor brevis digitorum pedis, that head namely that joins the flexor digitorum longus muscle in the sole of the foot, the lumbricales, flexor brevis minimi digiti, flexor brevis pollicis, transversalis pedis, adductor pollicis muscles, with various tendons and ligaments, the following objects present themselves to the view.

a. Tendon of the peroneus brevis muscle.

b, c, d, e, f, g. Tendon of the peroneus longus muscle.

h, i. Two extremities of the tendon of the tibialis anticus muscle.

k, l, m, n, o, p, q. Interosseal muscles.

r. Os calcis or calcaneum.

s. Talus or astragalus.

t. Os cubiforme or cuboid.

u. Os naviculare.

v. Os cuneiforme medium.

w. Os cuneiforme magnum.

x. Os cuneiforme minus.

α. External plantar artery.

β. Internal plantar artery.

γ. External digital artery.
. Internal digital artery.
ε. Interosseal artery
6. Internal branch of the internal plantar nerve.
14. Continued internal branch of the inner plantar nerve, which now forms the internal plantar nerve of the great toe.
45. External branch of the internal plantar nerve.
52. Internal, termed also deep branch of the external plantar nerve 55.
55. External plantar nerve.
64. Middle or external branch, termed also superficial, of the external plantar nerve 55, it descends to the external side of the little toe.
67. External branch of the external plantar nerve 55.
68. A branch of this nerve supplying the adductor muscle of the small toe.
69. A branch of the nerve 67, supplying the flexor brevis and interosseal muscle of the little toe.
70. A branch going to the flexor accessorius, or Massa Carnea Jacobi Sylvii.

PL. XIX.

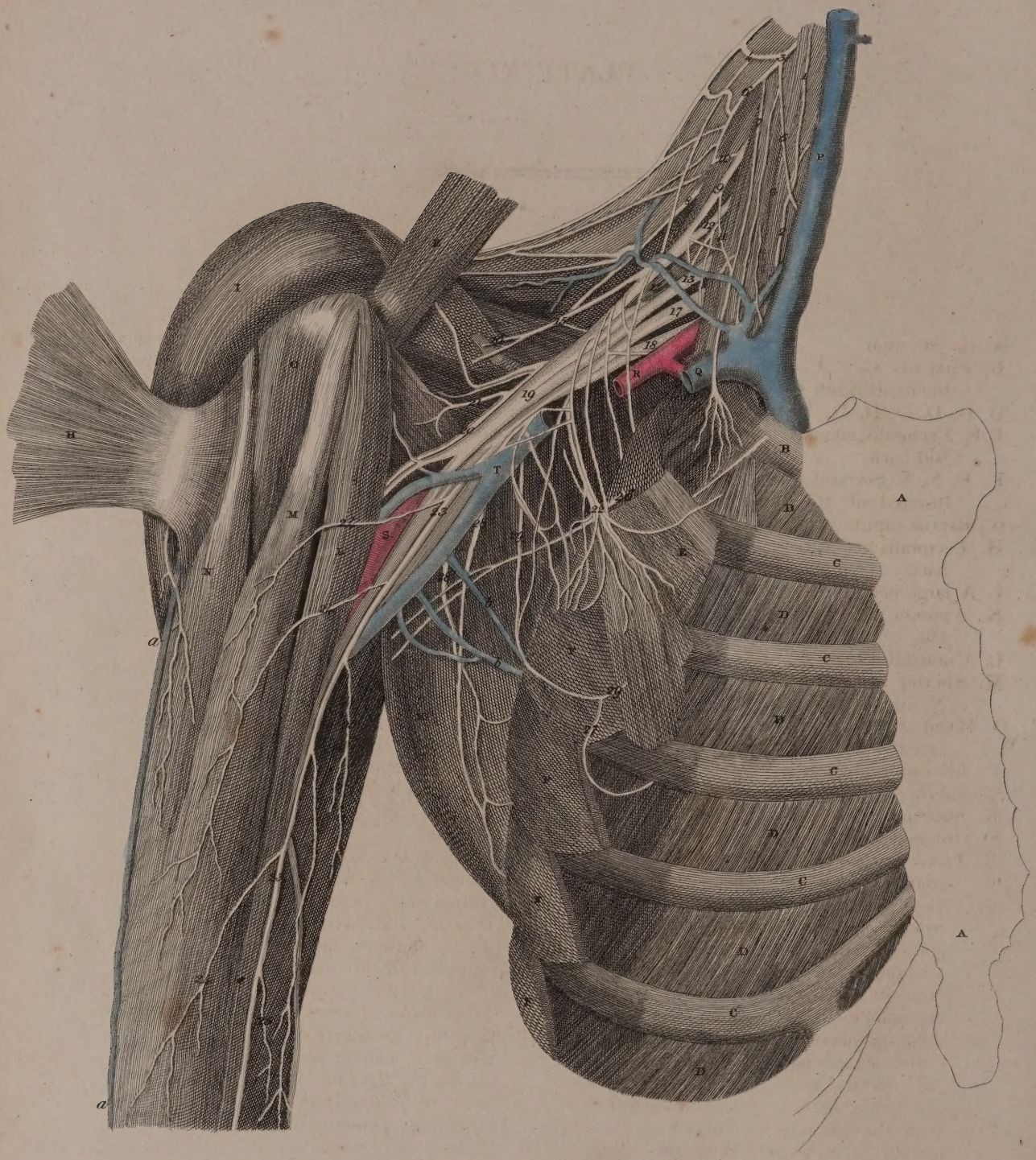

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PLATE XIX.

Nerves of the Arm.

A. A. Sternum.
B. First rib. C, C, C, C, C. other true ribs and their cartilages.
D, D, D, D, D, D. Intercostal muscles.
E.E. Pectoralis minor muscle cut through, and laid back.
F, F, F, F. Serratus magnus muscle where it is inserted into the ribs.
G. Rectus capitis anticus major.
H. Pectoralis major muscle, cut short and laid back.
I. A large portion of the deltoid muscle.
K. Anterior surface of the latissimus dorsi muscle.
L. Coraco-brachialis muscle.
M. Shorter head of the biceps flexor humeri. N. its longer head.
O. Head of the humerus surrounded only by the capsular ligament.
P. Internal jugular vein.
Q. Subclavian vein, cut short.
R. Subclavian artery.
S. Humeral artery.
T. Trunk of the veins of the arm, which is a continuation of the subclavian vein. a. a. Cephalic vein. b. b. Veins which come from the muscles occupying the anterior surface of the scapula, and are going to join the axillary vein.
1. Branch of the second cervical nerve, which descends to the sterno-thyroid muscle.
2. Intercostal nerve, running over the rectus capitis anticus major muscle.
3. Third cervical nerve. 4. Its posterior anastomosing branch. 5. Another anterior branch communicating with the intercostal nerve. 6. A branch which goes to form the supra scapular nerve. 7. First root of the phrenic nerve.
8. Posterior branch of the fourth pair of cervical nerves.
9. Fifth pair of cervical nerves. 10. A small branch of it going to the supra scapular nerve. 11. Another root of the phrenic nerve.
12. Sixth pair of cervical nerves.
13. Seventh pair of cervical nerves.
14. Portion of the scalenus medius muscle.
15. Supra scapular nerve.
16. Branch of 15, which passes through the notch in the superior costa of the scapula.
17. Eighth cervical nerve.
18. First dorsal nerve.
19. Brachial plexus of nerves consisting of the inferior cervical and first dorsal nerves.
20. Musculo-cutaneous nerve. 21. A small branch to the sub-scapular muscle. 22. Another branch distributed to the pectoralis major muscle.
23. Internal cutaneous nerve. 24, 24, 24. Three of its branches going to the biceps muscle. 25, 25. Branches to the triceps muscle.
26. Branch proceeding from the second pair of dorsal nerves, which after having passed through the intercostal space, gives off a branch, and having perforated the intercostal muscles, approaches the axilla to supply the skin and glands in that region *(now generally called the superior intercosto-humeral nerve.)*
27. Branch of the fourth dorsal nerve which in the same manner passes out of the thorax to supply the skin covering the serratus magnus muscle (now called the *inferior intercosto-humeral nerve.)*
28, 28. Nerves from the brachial plexus, supplying the latissimus dorsi and subscapular muscles.
29, 29. Other nerves going to the pectoralis major muscle, cut short.

PLATE XIX.

PL.XX.

Fig. 1.

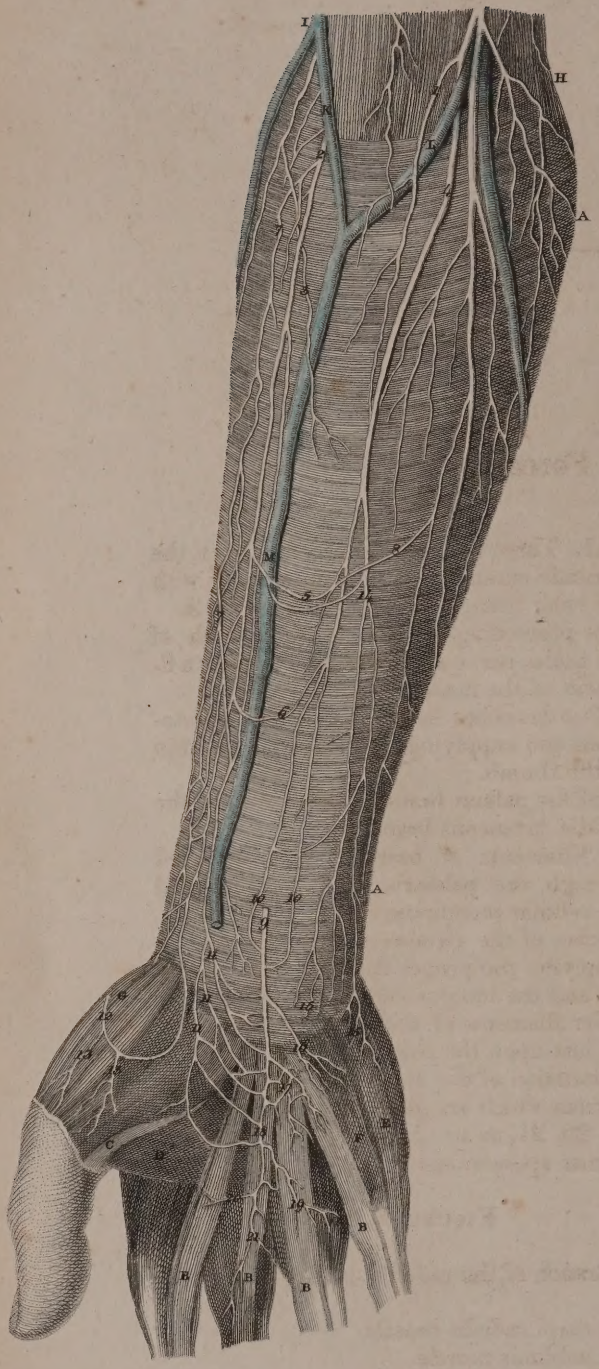

Fig. 2.

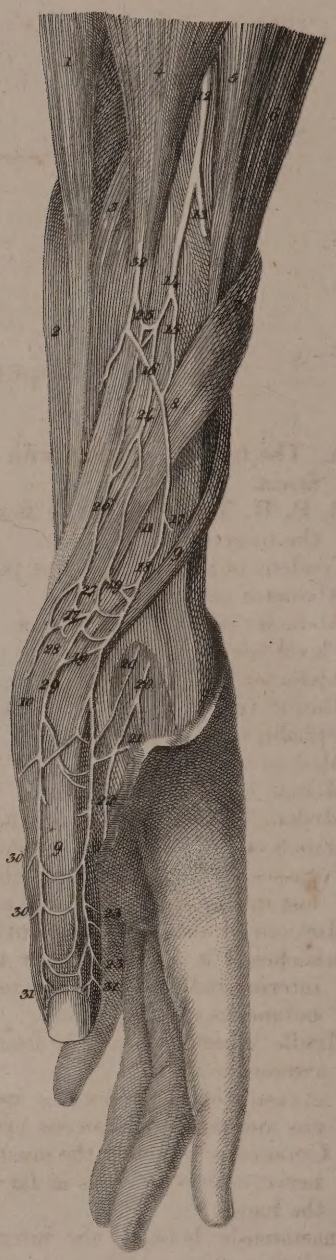

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PLATE XX.

Fig. 1.

Superficial Nerves of the Forearm.

A, A. The forearm covered with the superficial fascia.
B, B, B, B. Tendons of the flexor muscles of the fingers.
C. Tendons of the flexor longus pollicis muscle.
D. Abductor pollicis muscle.
E. Abductor minimi digiti muscle.
F. Flexor brevis proprius minimi digiti.
G. Abductor brevis pollicis muscle.
H. Basilic vein dividing.
I. Cephalic vein dividing
K. Median cephalic vein.
L. Median basilic vein.
M. Median, or internal radial vein.
1. Branch of the internal cutaneous nerve which passes over the median basilic vein and is lost in the superficial fascia of the forearm.
2. Musculo-cutaneous nerve, continued.
3. Branches of it which run over the median or internal radial vein to terminate in the subcutaneous cellular tissue.
4. Middle cutaneous branch from the internal cutaneous nerve.
5, 6. Anastomoses between the musculo-cutaneous and middle cutaneous branch, 4.
7, 7. Cutaneous branch of the musculo-cutaneous nerve, which proceeds as far as the palm of the hand.
8. Anastomosis between the internal cutaneous nerve and its middle cutaneous branch, 4.
9. Cutaneous branch of the median volar nerve.
10, 10. Two branches from the middle cutaneous branch. 4. Connected with the median volar branch 9.
11, 11, 11. Three branches proceeding from the musculo-cutaneous nerve, and uniting with the volar branch of the median nerve, 9.
12. Nerve proceeding from the dorsal branch of the radial nerve and anastomosing with a filament of the musculo-cutaneous nerve.
13, 13. Two branches arising from this anastomosis and supplying the muscles and skin of the thumb.
14. Cutaneous palmar branch, derived from the middle cutaneous branch, 4.
15, 15. Filaments of branch 14, distributed through the palmaris brevis muscle, and the cellular membrane covering the hand.
16. Branches of the cutaneous volar branch 9, supplying the proper flexor of the little finger and the integuments covering it.
17. Smaller filaments of the same nerve, which are lost upon the palmar aponeurosis.
18. Continuation of the cutaneous volar branch 9, from which are given off three branches, 19, 20, 21, to be distributed through the palmar aponeurosis.

Figure II.

Branch of the radial volar nerve.

1. Flexor carpi radialis muscle.
2. Flexor sublimis muscle.
3. Flexor longus pollicis muscle.
4. Supinator radii longus muscle.
5. Extensor carpi radialis longus.
6. Extensor carpi radialis brevis.

7. Extensor ossis metacarpi pollicis, or abductor pollicis muscle.
8. Extensor primi internodii pollicis, or extensor minor muscle.
9. Extensor secundi internodii pollicis, or extensor major muscle.
10. Abductor pollicis muscle.
11. The radius uncovered.
12. The radial nerve, coming out from under the supinator radii longus muscle.
13 Dorsal branch of 12 cut short.
14. Its anterior branch divides into two smaller branches.
15 Dorsal ulnar nerve of the thumb, coming from branch 14.
16. Anastomosis with the musculo-cutaneous nerve.
17. Small branch cut through which is ramified upon the skin, covering the metacarpal bone of the forefinger
18. Dorsal ulnar nerve of the thumb continued.
19, 19. Anastomoses with the dorsal ulnar and radial nerves
20, 20. Branches cut short which were connected with the dorsal branch of the radial nerve.
21. Branch distributed to the abductor indicis muscle.
22. A cutaneous branch.
23, 23. Filaments distributed to the integuments on the volar aspect of the thumb; these filaments communicate with a branch of the median nerve, also supplying the volar and ulnar aspect of the thumb.
24. Radial dorsal nerve of the thumb, arising from the branch 14.
25. Branch by which it is connected with the musculo-cutaneous nerve.
26. Branch of the radial dorsal nerve 24, descending to the abductor pollicis muscle.
27, 27. Branch 26, anastomosing with nerve 24.
28. Filaments by which it terminates in the abductor pollicis muscle.
29. Radial dorsal nerve of the thumb continued.
30. 30. Small branches which go to the skin, covering the volar side of the thumb, and meet the radial volar nerve.
31, 31. Nervous filaments which disappear beneath the nail.
32. Branch of the musculo-cutaneous nerve cut short.

PL. XXI.

Fig 1

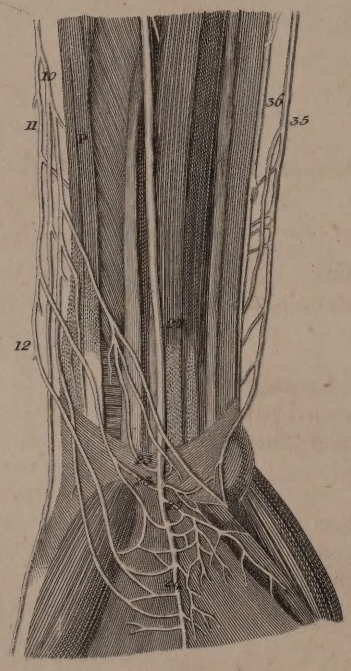

Fig 2.

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PLATE XXI.

FIGURE I.

Deeper Nerves of the Right Arm.

A. Head of the humerus.
B. Coracoid process of the scapula.
C, C. The right scapula sawn through and pulled upwards.
D, D. Subscapularis muscle.
E. Anterior portion of the deltoid muscle separated from the clavicle and turned outwards.
F. Portion of the pectoralis minor muscle cut through and raised upwards.
G. Coraco-brachialis muscle.
H. Portion of the biceps humeri muscle cut through and separated from the inferior portion 1. K, its tendon inserted into the radius.
L. Portion of the triceps muscle.
M. Superior portion of the pronator radii teres muscle cut through and laid over to the ulnar side of the arm. N, its inferior portion.
O. Superior portion of the flexor sublimis muscle.
P. Supinator longus muscle.
Q. Brachial plexus of nerves.
1. Supra-scapular nerve passing through the notch in the superior costa of the scapula towards the fossa supra-spinata.
2. Musculo-cutaneous nerve. 3, Branches of it piercing the pectoralis minor muscle. 4. 4. Where it passes through the fibres of the coraco-brachialis muscle. 5, Branches which go to the biceps muscle. 6,6. Other branches distributed to the superior portion of the brachialis muscle.
7. Anastomosis between a branch of the musculo-cutaneous and median nerve.
8, 8. Musculo-cutaneous nerve continued.
9, 9, 9. Branches distributed to the integuments cut short.
10. Division of the principal trunk of the musculo-cutaneous nerve. 11, Branch passing downwards, distributed to the skin of the thumb. 12, Another branch which separating into filaments anastomoses with branches of the median nerve.
13. Radial nerve, where it runs on the posterior surface of the humerus.
14, 15. A branch of it coming out anteriorily between the brachialis and supinator longus muscles.
16, Median nerve. 17, Remarkable branch distributed to the pronator radii teres muscle. 18, Another to the flexor sublimis muscle. 19, Branches to the inferior portion of the pronator teres muscle alone. 20, Internal interosseous plexus. 21, Filaments of the median nerve, which pass through the flexor sublimis muscle.
22. Long volar cutaneous branch of the median nerve.
23, 23. Anastomoses between it and branches of the musculo-cutaneous nerve.

24. Volar plexus, composed of a branch of the median volar nerve, and branches of the musculo-cutaneous nerve.
25. Branch distributed to the skin and aponeurosis covering the volar aspect of the hand.
26. Ulnar nerve.
27. Branch going to the triceps muscle.
28. Part where the ulnar nerve descends behind the internal condyle of the humerus.
29. Internal cutaneous nerve. 30, A branch of it which anastomoses with the musculo-cutaneous nerve.
31. Branch distributed to the pronator teres muscle.
32. Branches to the flexor sublimis muscle.
33. Branches penetrating the flexor carpi ulnaris muscle.
34. Dorsal nerve arising from the internal cutaneous nerve distributed to the skin, covering the back of the arm.
35. Lesser volar branch. 36. Greater.
37, 37, 37. Distribution of the subscapular nerve.
38. Shows the course of the circumflex, or articular nerve, amongst the fibres of the deltoid muscle.

Figure II.

Gives the course of the Median Nerve in the Arm and Hand.

A, B. Portions of the pronator radii teres muscle, a great part of it being removed.
C. Inferior extremity of the biceps muscle cut.
D. Tendon of the flexor carpi radialis muscle cut.
E. Tendons of the flexor sublimis muscle.
F. Supinator longus muscle.
G. Flexor carpi ulnaris muscle.
H. Deep flexor muscle of the fingers.
1. Trunk of the median nerve.
2. Branches distributed to the flexor profundus, and flexor carpi ulnaris muscles.
3. Branches to the flexor carpi radialis muscle.
4. Internal interosseal nerve.
5. Branches of it going to the flexor longus pollicis muscle.
6. Twig to the flexor profundus muscle.
7. Branches which terminate in the pronator quadratus muscle.
8. Long cutaneous branch.
9. Median nerve continued.
10. Branches of it going to the flexor, abductor, and opponens muscles of the thumb.
11. Radial volar branch of the thumb.
12. Nerves distributed to the integuments covering the thumb.
13, 13. Anastomoses between the radial volar and ulnar nerves of the thumb.
14. Nervous nail-formed arch of the thumb.
15. First common digital branch which 16, 16, increases the ulnar and volar nerve of the thumb, and 17 the radial nerve of the forefinger.
18. Nerves for the first lumbricalis muscle.
19, 19. Twigs which pass to the dorsum of the index-finger.
20, 20. Nervous arch, by means of which, the radial volar and radial ulnar nerves of the forefinger are connected.
21. Nervous nail-formed arch of the index finger.
22. Second common digital branch, which gives a nerve, 23, to the volar ulnar side of the forefinger, and another, 24, to the radial volar side of the middle-finger.
25, 25. Twigs distributed upon the dorsum of the middle-finger.
26. Third common digital branch which gives off the nerve 29 for the ulnar side of the middle-finger, and branch 31 to the radial side of the ring-finger.
27. Remarkable anastomosis between the median and ulnar nerves.
28. Branch to the third lumbricalis muscle.
30. Anastomosis of the second digital branch of the median nerve with a branch, 36, of the ulnar nerve.
32. Ulnar nerve.
33. Its deep branch.
34. Twigs proceeding to the abductor and flexor parvus muscles of the little finger.
35. Nerves distributed to the palmaris brevis muscle.
36. Volar ulnar nerve of the fourth finger.
37. Radial volar nerve of the little finger—38, volar ulnar nerve of the same finger.
39. Anterior branch of the radial nerve, running close to the artery of the same name.

PL. XXII.

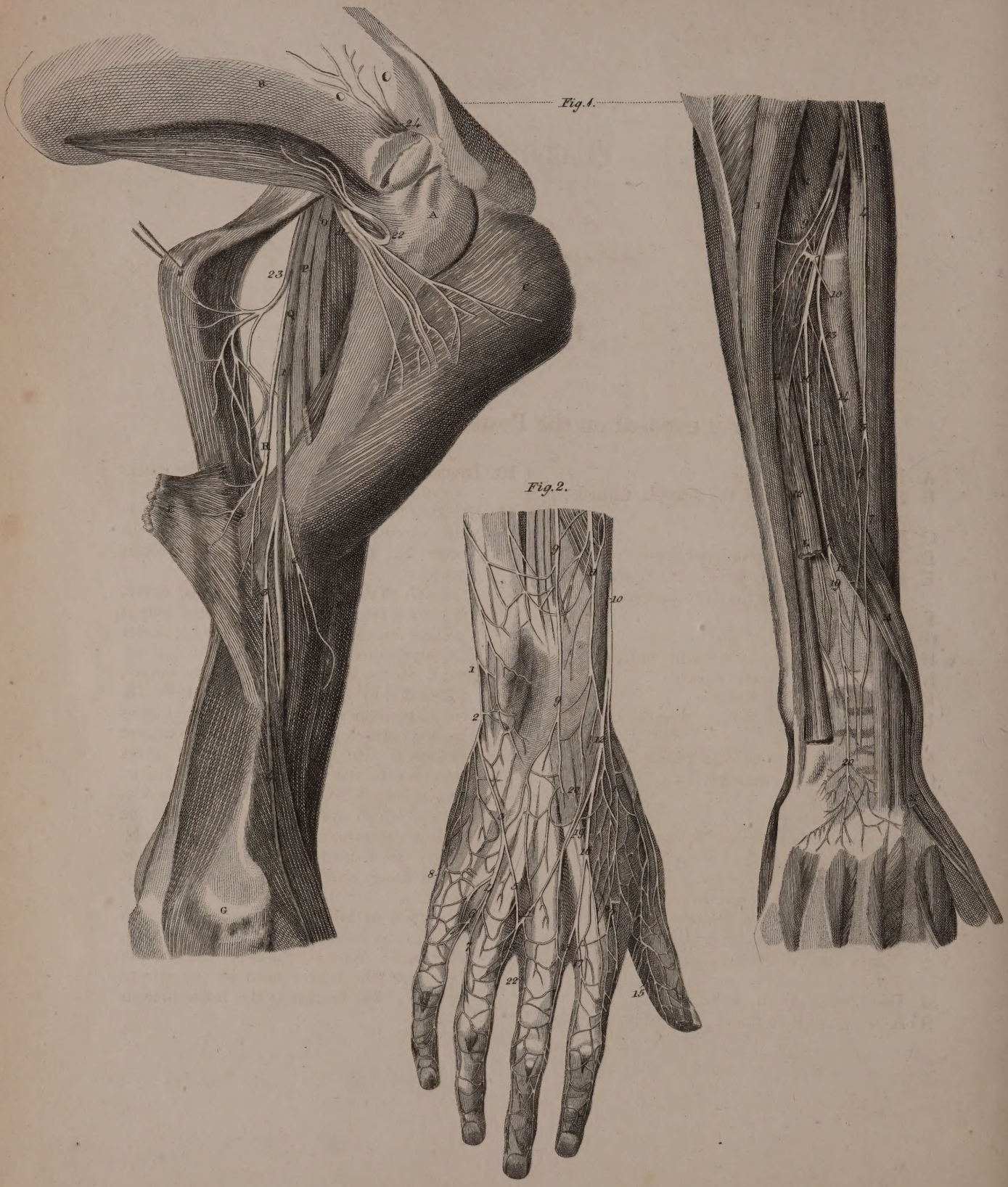

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PLATE XXII.

FIGURE I.

Radial Nerve exposed on the Posterior Surface of the Arm.

A. Head of the humerus.
B. Posterior surface of the scapula turned upwards.
C. Deltoid muscle.
D. Longer head of the triceps muscle.
E. Second head of the triceps cut through, that the radial nerve may be exposed.
F. Biceps muscle.
G. External condyle of the humerus.
H. Extensor carpi radialis longus muscle.
I. Extensor carpi ulnaris muscle.
K. Supinator brevis muscle.
L. Extensor longus pollicis muscle, cut short. N. its tendon.
M. Abductor longus pollicis muscle.
O. Trunk of the median nerve.
P. Ulnar nerve.
Q, 1. Radial nerve.
R. A remarkable branch of it, distributed to the second head of the triceps muscle: 2. Another branch to the brachialis muscle.
3, 4, 4. Superficial dorsal branch, which at 5, divides into 6, a branch to the abductor longus pollicis muscle, and 7, which inferiorly disappears through the cellular texture of the forearm.
8. Deep branch of the radial nerve.
9. A branch of it to the supinator brevis muscle.
10. Branch cut short, which went to the extensor muscle of the fingers.
11, 12. Two branches, one of which 11, goes to the extensor carpi ulnaris muscle; the other 12, to the extensor longus pollicis muscle.
13. A branch of the external interosseous nerve, it gives a twig 14, to the abductor longus pollicis muscle, then descending 15, makes its appearance deeper seated.
16. Trunk of the external interosseous nerve; 17, is divided into various branches; 18, some are implanted into the abductor longus pollicis muscle (extensor ossis metacarpi pollicis;) 19, one descends and gives branches to the adjoining cellular tissue, and at length 20, terminates in many filaments, which are distributed partly to the capsular membrane surrounding the joints, partly to the common dorsal membrane of the hand, and also to the interosseous muscles.
21. Circumflex or articular nerve; 22, branch which runs partly through the deltoid muscle, partly through the teres minor; 23, branch to the longer head of the triceps muscle; 24, branch to the infra-spinatus muscle.

FIGURE II.

Superficial Nerves on the Dorsum of the hand.

1. Dorsal branch of the ulnar nerve.
2. Branch anastomosing with the middle branch of the cutaneous nerve 9.
3. Common trunk of 4, 7, the dorsal ulnar nerve of the ring-finger; and of 6, the nerve for the radial side of the little finger; also of the branch 5, which joining with branch 21, supplies the nerve 23 for the radial side of the ring-finger.
10. A branch from the musculo-cutaneous nerve, bending round to the lower part of the arm, where uniting with 11, a branch of the radial nerve, first gives off the common dorsal branch 13, from which arise the nerve 14 for the radial side of the index-finger; and 15, supplying the ulnar side of the thumb; it then gives off the nerves 16 and 19, which again distribute a branch 17, to the ulnar side of the index; another 22, to the ulnar side of the middle finger; and 18, a branch supplying its radial side.
8. Branch of nerve 1 distributed to the ulnar side of the little finger.

PL.XXIII.

Fig.1.

Fig.3.

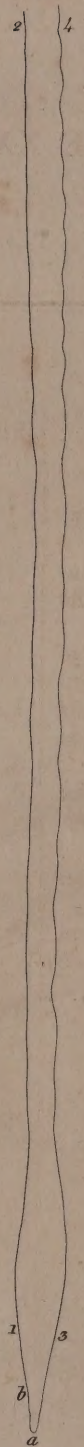

Fig.4.

Fig.5.

Fig.6.

Fig.2.

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PLATE XXIII.

Figure I.

Anterior surface of the spinal marrow.

A, A, A. The dura mater divided longitudinally, and reflected on both sides.

B, B. The ligamenta denticulata of the dura mater, attached to all the spaces between the nerves.

C. Ligament continued from the lowest point of the pia mater along with blood-vessels, running out through the middle of the cauda equina, resembling an azygos nerve, and at length terminates in the os coccygis.

a, *b*. Two eminences resembling ganglia, the one inferior, the other superior, in which the lowest point of the cord ends.

c, *d*. Anterior middle furrowed line of the spinal cord.

E. Place where nervous filaments begin to run together, and the base of the cauda equina is formed.

f. Accessory nerve.

g. Cauda equina.

1—5. Sacral nerves.

6—10. Lumbar nerves.

11—12. Dorsal nerves.

22—25. Nerves which concur in forming the brachial plexus.

23—30. Eight pairs of cervical nerves.

Figure II.

Posterior surface of the same spinal cord.

e, *e*. Lateral furrows near to the posterior median line in the cervical portion of the cord.

Filaments are seen between the nerves 21 and 22, between those which are marked 22 and 23, as well as between 24 and 25, then between 25 and 26, and 26 and 27, which pass from one pair of spinal nerves to another.

Figure III.

1, 2. Anterior surface of the spinal cord, viewed from the left side.

3, 4. Its posterior surface.

a, *b*. Two eminences, vid. fig. 1. a, b.

Figure IV. V. VI.

Sections of the spinal cord of a boy four years of age, in the region of the inferior cervical nerves.

IV. Anterior sulcus divided.

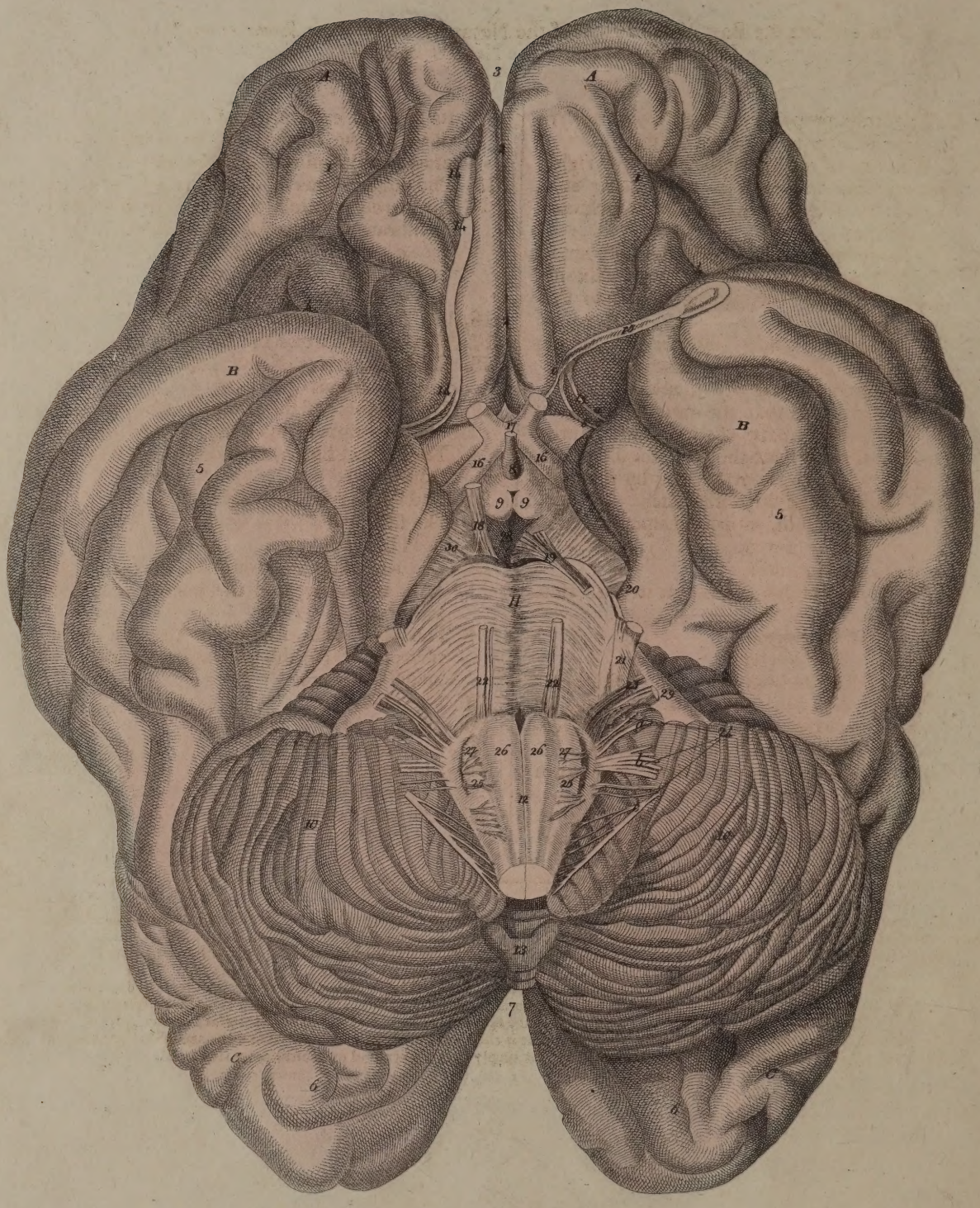
l, *l*. Its lateral portions—*a*, *a*. bundles of fibres seen in the bottom of the furrow, which connect the sides together.

V. Posterior furrow divided—*l*, *l*. the sides of the furrow—*a*, *a*. fibres observed in the bottom of the furrow connecting the sides.

VI. Transverse section: *a*, *a*. nervous or medullary columns: *b*, middle posterior furrow: *c*, another anterior furrow: 1—2. place where the cineritious substance divides the medulla of each column: *i*, *d*, origin of the anterior roots of the spinal nerves.

2. Their posterior roots passing out from the posterior surface of the cord.

I SUPPLEMENTARY PLATE.



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SUPPLEMENTARY PLATE.

This exhibits the Base of the Brain, of the Natural Size.—*(from Soemmering.*)*

A, B, C. The Brain properly so called (*Cerebrum.*)†

1, 1. The anterior lobes of the brain.

2, 2. The line of separation between the right anterior lobe and the left, these being still joined by the pia mater and arachnoid membranes.

3. The hiatus between the right and left anterior lobes, which is filled up by the falx of the dura mater where it is attached to the crista galli.

4. The fissure between the anterior and middle lobes commonly called the fossa of Sylvius.

5, 5. The middle lobes, which always project more downwards than the anterior.

6, 6. The posterior parts of the brain, improperly called by some the posterior lobes.

7. The hiatus which is partly filled by the falx and tentorium of the dura mater.

8. The infundibulum, supported upon the union of the optic nerves.

9, 9. Corpora albicantia.

10, 10. The cerebellum, divided at its base into right and left lobes.

11. The tuber annulare.

12. The medulla oblongata.

13. That part of the cerebellum where the lobes adhere; by some supposed analogous to the corpus callosum. Many call it the vermiform process of the cerebellum. By Vicussens it is called the posterior vermiform process.

14, 14, 14. The right olfactory nerve lying in its natural situation, its roots behind, and its bulbous extremity before. It is bound down to the surface of the brain by the arachnoid membrane passing over it.

15. The olfactory nerve of the left side reflected by merely cutting through the arachnoid membrane, and displacing the nerve.

a, External root.‡

b, Internal root.

c, Superior or cineritious.

16, 16. The optic nerves.

17. The commissure of the optic nerves.

18. The right nerve of the third pair in its natural situation.

19. The left nerve of the third pair thrown aside, that its origins§ may appear more distinct. The radical filaments are collected into one trunk.

20. The left nerve of the fourth pair.

21. The fifth pair.

22, 22. The sixth pair.

23. The seventh pair, composed of the *portio dura* anteriorly, and the *portio mollis* posteriorly.

24. The eight pair, formed of (*a*) the glossopharyngial, (*b*) the par vagum, and (*c*) the spinal accessory.

25. The ninth pair.

26. The corpora pyramidalia.

27. The corpora olivaria.

28. The substantia perforata.

29. The crura cerebelli.

30. The crura cerebri.

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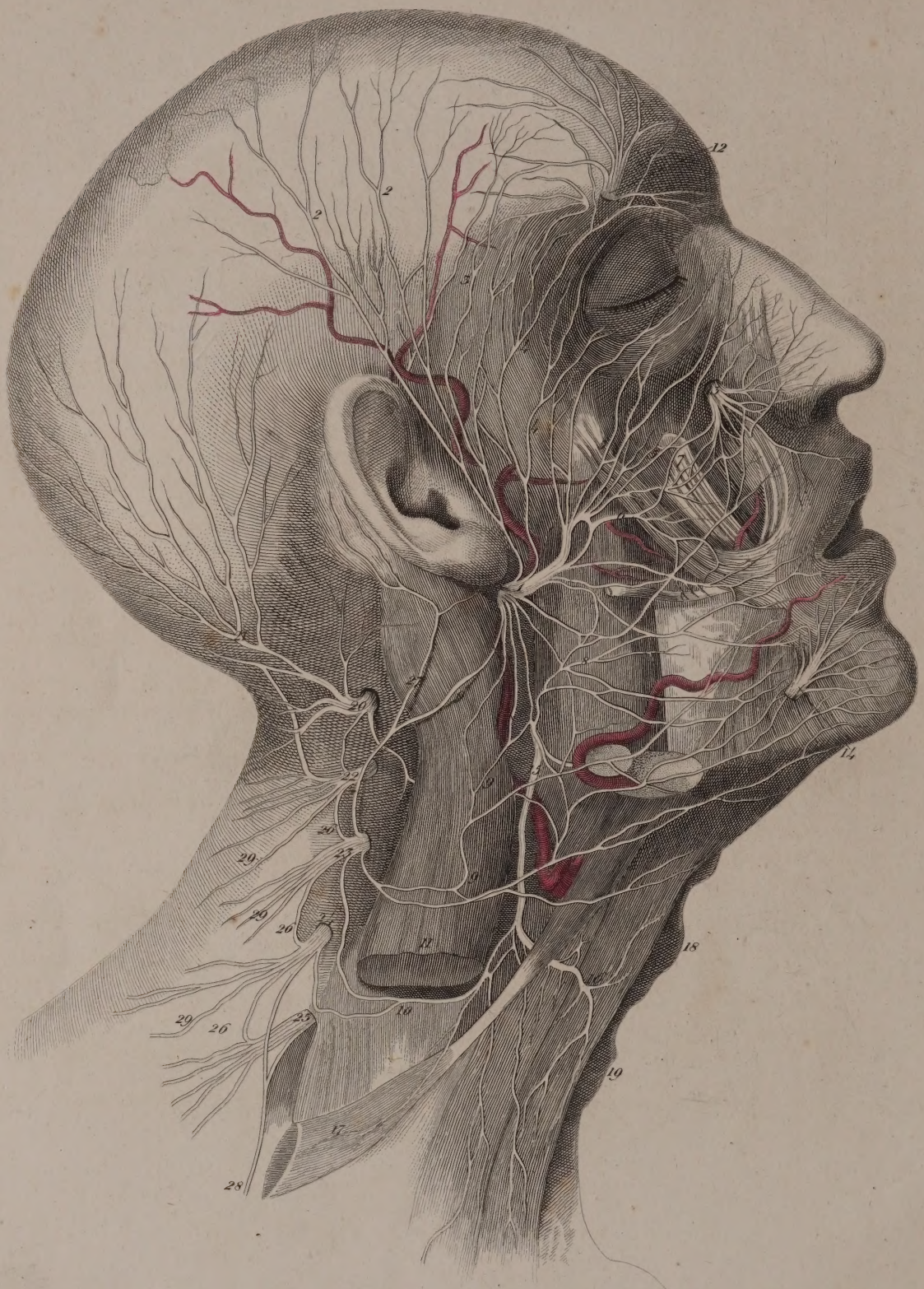
* Much care has been taken by the Author to make this accurate; he has carefully marked all the fissures and convolutions as they existed in nature.

† There is a want of symmetry in this brain, such as is frequently seen in nature, the left side being somewhat larger and fuller than the right.

‡ The student must not suppose, that although he cannot at all times make out these roots of the olfactory nerve, that there is any thing doubtful or ideal in the dissection and description of Soemmering. A pathological case, in which a tumour, growing from, or connected with, the dura-mater covering the cribriform plate of the ethmoid bone, pressed on the inferior surface of this part of the brain, showed me the roots of this nerve as distinct and formal as is shown in this plate, and that without the smallest dissection.

§ The word origin is used without any reference to theory, but simply to imply cerebral or central connexion.



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II. SUPPLEMENTARY PLATE.

This Plate represents the Superficial Nerves of the Face and Neck. The Parotid Gland has been removed, in order to expose the Branches of the Facial Nerve which are imbedded in its substance.

1. Superior or temporo-facial branch of the facial nerve, or portio dura of the seventh pair.
2, 2. Temporal filaments of the same branch which are distributed to the temporal region and summit of the head.
3. Other filaments of the facial nerve extending to the forehead, and anastomosing with the frontal branch of the ophthalmic nerve.
4. Filaments of this nerve to the eyelids.
5, 5. Other filaments proceeding to the side of the nose.
6. Branch of the facial nerve, the filaments of which lose themselves in the muscles of the mouth and the integuments of the cheek.
7. Anastomosis of the anterior branches of the facial with the infra-orbital nerve. From this anastomosis branches pass off to the muscles of the mouth, and one branch which is lost in the muscles of the wing of the nose.
8. Branches of the facial nerve extending to the angle of the mouth and the muscles of the lower lip: they anastomose with filaments of the mental nerve.
9, 9, 9. Superficial nervous plexus formed on the side of the neck by an anastomosis between the branches of the facial and cervical. From this plexus arise filaments which go to the lower part of the face and the upper and fore part of the neck.
10. Anastomosis formed by the phrenic nerve, the descendens noni, and the facial nerve.
11. Sterno-mastoid muscle cut in its middle.
12. Frontal branch of the ophthalmic nerve, giving some filaments to the upper eyelid, and dividing into branches which separate from one another, and ascend to be distributed to the muscles and skin of the forehead.
13. Infra-orbital nerve. The branches of this nerve are distributed to the muscles and integuments of the nose, cheek, the upper lip and eyelids.
14. The mental nerve. The numerous filaments of this nerve are lost in the muscles and integuments of the lower lip and chin.
15. Descending branch of the hypoglossal nerve. We here see the anastomosis which this nerve forms with the cervical spinal nerves and the phrenic.
16, 16. Filaments which the descendens noni gives to the sterno-thyroid and sterno-hyoid muscles.
17. Twigs of the same nerve to the omo-hyoideus muscle.
18. Projection of the thyroid cartilage.
19. Thyroid Body.
20. First cervical nerve.
21. Ascending Branches of the first cervical nerve ramified in the occipital region.
22, 23, 24, 25. Second, third, fourth, and fifth cervical nerves.
26, 26, 26, 26. Filaments by which the cervical nerves anastomose with each other: they concur in the formation of the cervical plexus.
27. Mastoid branch from the cervical plexus.
28. Phrenic nerve.
29, 29, 29. Descending branches of the cervical plexus.